Technology Review

Edited at the Massachusetts Institute of Technology

January, 1964

technology
review
Published by MIT

PHYSICIAN

He's an examiner . . . a consultant . . . an expert on injuries . . . a trouble-shooter wherever employe physical welfare is concerned. He's a dedicated man with a vital, demanding job . . . *the General Motors doctor.* Here he's checking an employe's blood pressure—part of a complete examination to determine this man's fitness for his job—and to evaluate his future work capability.

The prevention and control of *on-the-job* injuries are this doctor's prime concern. He deals mostly in remedial medicine rather than reparative medicine. Because injuries *away from work* are 12 times as numerous as those on the job, more than three out of four visits to the Medical Department are for *non-occupational* consultation and examination, but no attempt is made to take the place of the family doctor.

This doctor is one of 146 physicians and 638 nurses who make up the GM Medical Staff in plants throughout the United States and Canada. The GM Medical Department was established in 1915 as one of the pioneer programs of its kind. GM doctors and nurses work with the same ultra-modern equipment you'll find in the finest clinics and hospitals. As part of their accident-prevention work, they tie in closely with plant safety departments.

The people in the Medical Departments—doctors and nurses—provide a very important service to General Motors. They're working to improve the physical welfare of people. And people, of course, are the number-one asset of General Motors.

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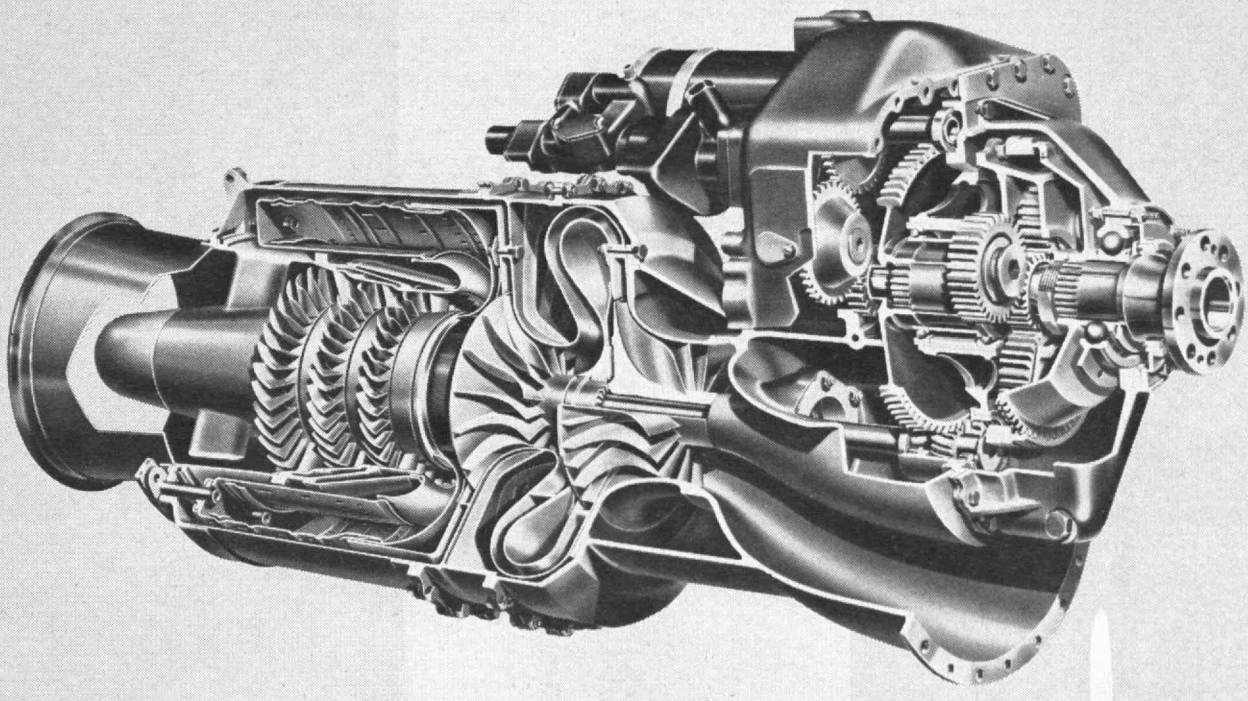
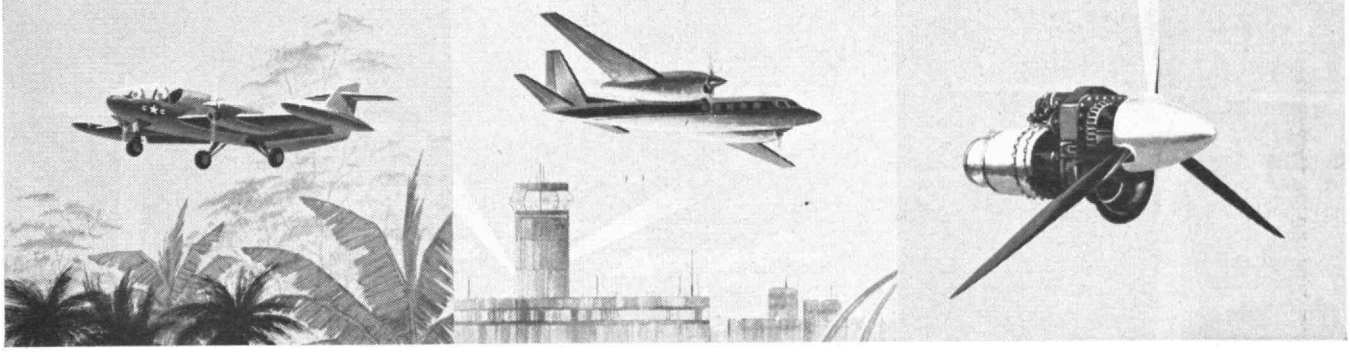
TURBOPROP ENGINE FOR LIGHT AIRCRAFT

AIRESEARCH MODEL 331





This 600 horsepower turboprop engine is designed to power the new generation of light, fixed wing aircraft for both civil and military applications. • The Garrett-AiResearch TPE-331 has a specific fuel consumption of .62 pound per shaft horsepower-hour, and a weight to power ratio of .45 pound per horsepower. The engine has a response rate from flight idle to full power of approximately 1/3 of a second. A military version has been designated the T76 by the U.S. Navy. • Designed specifically as a prime power plant, the model 331 is backed by the company's experience in producing over 10,000 gas turbine engines. A unique offset gearbox permits flexibility of application while a straight forward induction system minimizes installation costs. Opposite output rotation can be made available, and controls are adaptable for a prop governing, beta, or combination system. • The Model 331 engine is programmed for additional performance growth. The turboshaft version (TSE-331) has been flight tested as a power plant in rotary wing and vertical lift vehicles. Please direct inquiries to the Phoenix Division.

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Space Surveillance Techniques
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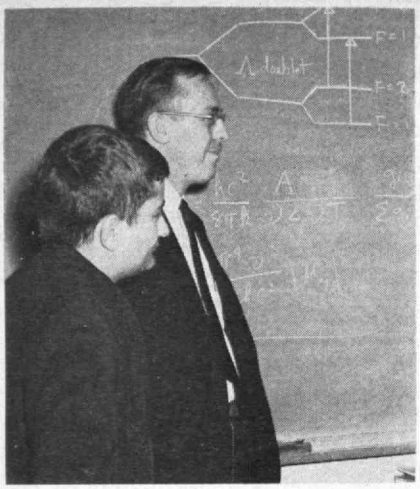
Space Communications

A description of the Laboratory's work will be sent upon request.

Phased Array Radar



Sander Weinreb, '58 (left), and Associate Professor Alan H. Barrett are seen here explaining how OH was detected in space. This was big news to radio astronomers, for the reasons explained in the article on page 12 of The Review this month.

TECHNOLOGY REVIEW is published monthly from November to July inclusive, on the 27th day of the month preceding the date of issue, by the Alumni Association of the Massachusetts Institute of Technology. All correspondence regarding its editorial contents, subscriptions, advertising, and changes of address should be addressed to:

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Cambridge 39, Mass.

The Review's publisher and editor is *Volta Torrey;* business manager, *R. T. Jope, '28;* assistant to the editor, *Ruth King;* and class news editor, *Roberta A. Clark*. Editorial consultants are *J. J. Rowlands, Francis E. Wylie,* and *John I. Mattill*. Members of its staff are *Madeline R. McCormick, Joyce Skinner,* and *Maxine Kenny*.

Officers of the Alumni Association of M.I.T. are: *Robert H. Winters, '33,* President; *Donald P. Severance, '38,* Executive Vice-president; *F. Leroy Foster, '25,* and *Samuel A. Groves, '34,* Vice-presidents; and *Frederick G. Lehmann, '51,* Secretary.

An annual subscription to Technology Review is $4 in the U.S., $4.50 in Canada and elsewhere, and a single copy, 60 cents. Three weeks must be allowed to effect a change of address, for which both the old and the new address of the subscriber should be given.

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Technology Review

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Edited at the Massachusetts Institute of Technology

Volume 66, Number 3

Contents

January, 1964

Individuals Noteworthy

Dean of Science

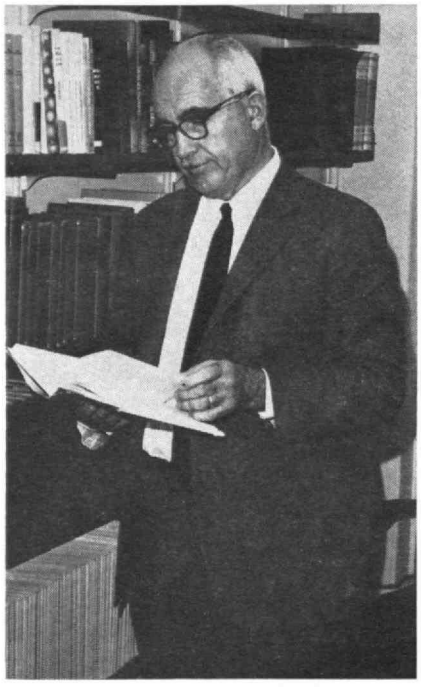
INSTITUTE PROFESSOR Jerome B. Wiesner, who has been on leave from M.I.T. since 1960 to serve at the White House as Special Assistant for Science and Technology, will return to the Institute early this year to become dean of the School of Science.

Provost Charles H. Townes announced in November that Dean George R. Harrison, who has headed the School of Science since 1942, would retire soon and be succeeded by Dr. Wiesner.

The retiring dean was graduated from Stanford University and received his Ph.D. degree there in 1922 while an instructor of physics. He was a National Research Fellow at Harvard University for two years, then returned to Stanford and remained on the faculty there until his appointment at M.I.T. in 1930.

In spectroscopy, his field of specialization, Dr. Harrison invented several instruments of great value and compiled the M.I.T. Wavelength Tables, an encyclopedic work used by spectroscopists throughout the world. He was editor of the *Journal of the Optical Society of America,* co-author of *Practical Spectroscopy,* and author of *Atoms In Action, What Man May Be,* and other books. During World War II, Dr. Harrison was chairman of the Instruments Section, and later chief of the Optics Division of the National Defense Research Committee, Office of Scientific Research and Development, and for a time chief of the Research Division at General MacArthur's headquarters in the Southwest Pacific. He received the War Department Medal of Freedom and Presidential Medal for Merit. He also was awarded the Rumford Medal of the American Academy of Arts and Sciences, the Frederic Ives Medal of the Optical Society of America, the Elliott Cresson Medal of the Franklin Institute, and the Medal of the Society of Applied Spectroscopy.

Dr. Wiesner received his bachelor of science, master of science, and



Dean George R. Harrison

doctor of philosophy degrees from the University of Michigan. In 1940 he was appointed chief engineer of the Acoustical and Record Laboratory of the Library of Congress and in 1942 he came to the Radiation Laboratory at M.I.T., where he was a member of the Microwave Components Division and then group leader of Project Cadillac, assigned to devise an air-borne radar system. After the war Dr. Wiesner spent a year at Los Alamos, returning to M.I.T. as assistant professor of electrical engineering. He was made an associate professor in 1947, professor in 1950, and Institute professor in 1962. In 1947 he became assistant director of the Research Laboratory of Electronics; in 1949, its associate director, and in 1952, its director. He was appointed acting head of the Department of Electrical Engineering in 1959.

Dr. Wiesner's scientific contributions, particularly in microwave theory, have been notable. He was one of the principals in the conception of scatter transmission, and he participated in several summer studies of great importance to national defense. He was chairman of the Institute's steering committee for a Center for Communication Sciences established in 1958. Dr. Wiesner also was staff director of the American delegation to the Geneva Conference for the Prevention of a Surprise Attack in 1958, and for a number of years he has devoted much effort to the search for methods of arms control. Already a member of the President's Science Advisory Committee, he went to Washington from M.I.T. in 1960 and was made director of the Office of Science and Technology when that agency was established in 1962. He has received the President's Certificate of Merit and is a member of the National Academy of Sciences.

Honored Leaders

LAST NOVEMBER, James R. Killian, Jr., '26, Chairman of the M.I.T. Corporation, received the 1963 Hoover Medal from the American Society of Mechanical Engineers; and Charles H. Townes, Provost of M.I.T., received both the John Scott Award of the Board of Directors of City Trusts in Philadelphia, and the Harrison Howe Award of the Rochester, N.Y., Section of the American Chemical Society.

M. deK. Thompson: 1877-1963

A TEACHER at M.I.T. for 40 years, Professor Emeritus Maurice deKay Thompson, '98, died on November 5 in Mount Kisco, N.Y. He was a noted electrochemist who published widely, and his book *Theoretical and Applied Electrochemistry* went through several editions.

Born in Covington, Ky., Professor Thompson became an instructor in the Department of Physics after his graduation from M.I.T. He received his doctorate at the University of Basel in Switzerland in 1903, and returned to serve on the Institute's Faculty until his retirement in 1942. In 1944 he was named professor of physics at Massachusetts State College and in 1951 he became a lecturer in physics at Northeastern University. Professor Thompson also carried out several research projects in industrial laboratories.

He is survived by his daughters: Mrs. Grenville Goodwin, of Mount Kisco; Mrs. David Riesman, Jr., of Cambridge; and Clare deKay Thompson, of Washington, D.C.

(Continued on page 6)

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Individuals Noteworthy

(Continued from page 4)

Life Member

ROBERT C. GUNNESS, '34, an alumni term member of the M.I.T. Corporation for the last five years, has been elected to life membership. Dr. Gunness is a director and executive vice-president of the Standard Oil Company of Indiana, and was formerly an assistant professor in the Department of Chemical Engineering at the Institute.

He is a trustee of the University of Chicago and the John Crerar Library, and a member of several professional and community organizations. In 1951-1952 he was president of the M.I.T. Club of Chicago. His home is in Flossmoor, Ill.

Hydraulic Researchers

AT THE 10th Congress of the International Association for Hydraulic Research in London last fall, M.I.T. participants included Professors *Arthur T. Ippen* (the retiring President), *James W. Daily* (the U. S. representative), and *Donald R. F. Harleman, '47;* Associate Professor *Peter S. Eagleson, '56;* and *Giorgio Bugliarello, '59, Chaim Elata, '61, Charles E. Carver, Jr., '49, Hunter Rouse, '29,* and *Raymond Boucher, '34.*

Professors in the News

CYRIL STANLEY SMITH, '26, Institute Professor, was among those chosen to discuss the work of Henry Clifton Sorby, father of modern metallurgy, at the American Society for Metals' Exposition and Congress in Cleveland. . . . *Dayton E. Carritt,* Professor of Chemical Oceanography, is on the American Chemical Society's Advisory Committee for its exhibit at the New York World's Fair.

Robert C. Gunness, '34

Honors to Professors

PIETRO BELLUSCHI, Dean of the School of Architecture and Planning, received the 1963 gold medal last fall from the Boston Italian-American Charitable Society. . . . *John E. Burchard, '23,* Dean of the School of Humanities and Social Science, received the Air Force Scroll of Appreciation for his work as military co-ordinator of the Air Force R.O.T.C. program at M.I.T. . . . *Richard C. Lord,* Professor of Chemistry, is the 1964 president of the Optical Society of America.

Honors to Alumni

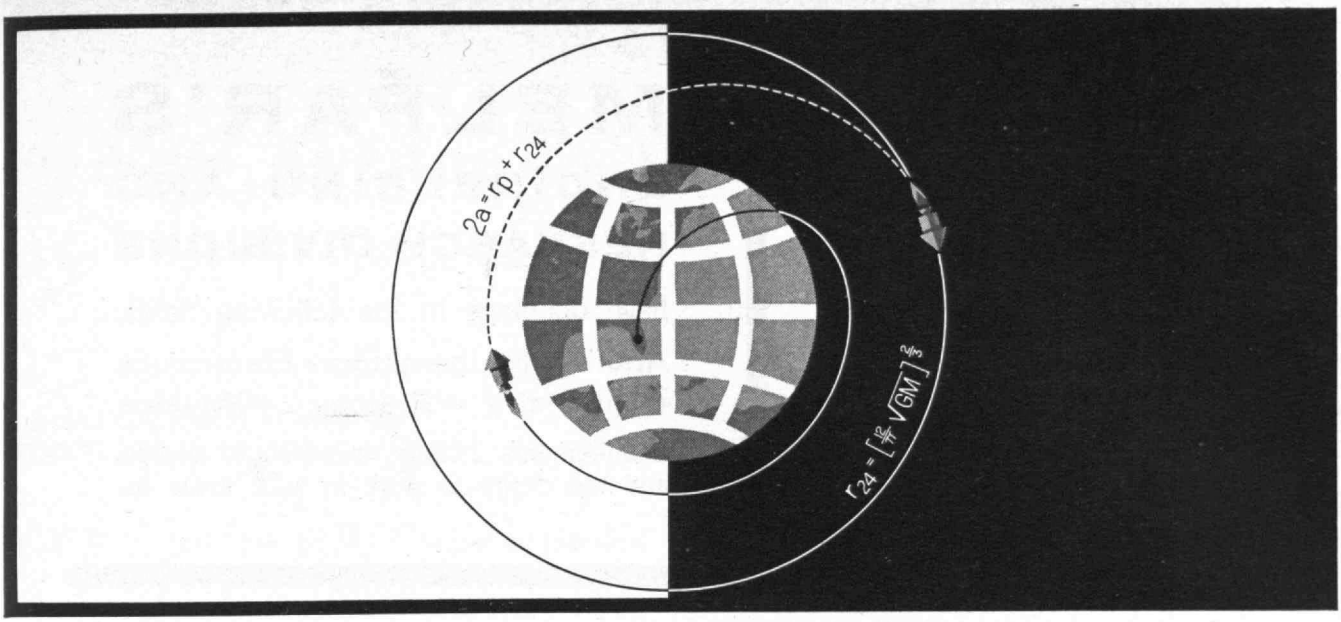
RECIPIENTS of recent awards and similar distinctions have included:

John W. Rockefeller, Jr., '20, the New Jersey Author Awards Citation, by the New Jersey Association of Teachers of English, for "The Poor Rockefellers" . . . *Nathan Cherniack, '22,* the Theodore M. Matson Memorial Award by the Institute of Traffic Engineers . . . *William Hurst, '28,* the Anthony F. Lucas Gold Medal by the American Institute of Mining, Metallurgical and Petroleum Engineers;

Colonel Leo A. Kiley, '39, the Legion of Merit (First Oak Leaf Cluster) by the U. S. Air Force . . . *John G. Linvill, '43,* and *William K. Linvill, '45,* Achievement Citations by William Jewell College;

Marshall Fixman, '54, the American Chemical Society Award in Pure Chemistry sponsored by the Alpha Chi Sigma Fraternity . . . *Lieutenant David C. deVicq, '57,* the Legion of Merit Medal by the U. S. Navy . . . *Gerald C. Pomraning, '62,* the Mark Mills Award by the American Nuclear Society.

(Continued on page 28)



scientists, engineers, mathematicians...
transfer with minimum energy

Use of the Hohmann formulae to transfer bodies from orbit to orbit makes it possible to place satellites in synchronous orbits on equatorial planes. AC-Milwaukee is seeking scientists, engineers and mathematicians to help develop the guidance systems and hardware that will achieve synchronous orbits.

AC's highly skilled scientific team has played an important role in advancing the state of the art in inertial guidance theory, development and production. Singular successes have been achieved by AC in the development of the Apollo Command Module guidance and navigation system, the inertial guidance systems for Titan II and Titan III, plus other guidance and navigation systems and components for space vehicles, missiles and aircraft.

Specific openings for all AC locations—AC-Milwaukee, AC-Los Angeles and AC-Boston—are listed below. For more information, send your résumé to G. L. Raasch, Director of Scientific and Professional Employment, Dept. 5753, AC Spark Plug Division, Milwaukee 1, Wisconsin.

Milwaukee Systems Design, Development, Manufacturing Facility

SYSTEMS ANALYTICAL ENGINEERS — Perform analytical studies of inertial guidance systems, including analysis of system performance requirements, writing system model and error allocation specifications, conducting system simulations on digital and/or analog computers, conducting trajectory studies, and preparing guidance equations. BS, MS or PhD in EE, math and physics plus 2-5 years experience depending upon education.

SYSTEMS MECHANIZATION ENGINEERS—To design and mechanize inertial guidance systems or subsystems. BS, MS or PhD in EE, math or physics with minimum of 2 years aircraft or fire control experience employing closed loop systems, switching circuits and digital techniques.

CIRCUIT DESIGN & ANALYSIS ENGINEERS—To design and/or analyze servo amplifiers, DC operation amplifiers, power converters, feedback amplifiers and pulse circuits. BSEE plus 3-5 years experience.

DIGITAL COMPUTER ENGINEERS—Logic design, evaluation of logic techniques, evaluation of memory storage, development of programming format and define computer subsystem functional block diagrams and input-output devices. BS or MS in EE or math and physics and 3-7 years experience in logic circuit design.

SCIENTIFIC PROGRAMMERS—Assist engineers in problem analysis and prepare computer programs for solution of engineering and scientific problems. BS or MS in math or engineering with 1-3 years experience using high speed digital computers.

SYSTEMS ENGINEERS—Implementation of original designs on inertial, optical, servo or digital or control subsystems. Will define hardware performance, coordinate system integration, develop test requirements and procedures and evaluate system test and checkout. BSEE and 2-5 years related experience.

EQUIPMENT DESIGN ENGINEERS—Design and development of transistorized electronic airborne and GSE equipment. BSEE or ME with 2-5 years design experience.

TEST EQUIPMENT ENGINEERS—Perform research and development of advanced electronic test equipment. MSEE or Physics degree, plus 2-5 years related experience desired.

Boston Advanced Concepts R&D Laboratory

SENIOR ELECTRONIC ENGINEERS—To design and develop semiconductor circuits; pulse and logic circuits; digital-analog circuits, low-drift DC amplifiers; feedback and servo amplifiers. BS or MS required. Experience in servo design and project activities desirable.

SENIOR MECHANICAL ENGINEER—Responsible for the development of inertial instruments through the use of analysis and experimental verification. BSME plus 3-5 years experience in the design and development of precision electromechanical devices.

MECHANICAL ENGINEER—Design of miniature inertial platforms and gimbal systems. BS and 3-5 years experience in above field and inertial instrument application.

INERTIAL & SPACE SYSTEMS ENGINEERS—To engage in the analysis, synthesis and mechanization and/or evaluation of advanced inertial navigation systems. Will perform optimization studies, error analyses and systems configuration studies in the field of space navigation, avionics, and attitude control systems. Advanced degree or BS with analytical systems background required.

DIGITAL SYSTEMS ENGINEER—To engage in the adaptation of digital techniques to inertial navigation and avionics systems. BSEE and 3-5 years experience in the design of digital control systems required.

SENIOR METALLURGIST—For inertial components materials group. Must have broad knowledge and experience with materials used in instrument design. Will be responsible for the evaluation of materials and methods of joining and working materials for use in inertial components. Will also study creep characteristics and structural effects by use of strength testing machines and metallograph studies. BS or advanced degree required.

SENIOR MATHEMATICAL ANALYST—To engage in mathematical and computer studies relating to the evaluation and optimization of new and improved inertial instruments, components and/or systems. BS or MS in applied mathematics or physics, plus three or more years of experience in mathematical and/or computer analysis.

PHYSICISTS & ENGINEERS—Excellent positions are available for senior physicists and engineers preferably having advanced degrees and experience in the theoretical and experimental development of precision devices. The particular area of investigation relates the application of mechanics, electricity, nucleonics and physical phenomena to inertial measurement components such as gyros and accelerometers.

Los Angeles Advanced Concepts R&D Laboratory

SENIOR SCIENTIFIC PROGRAMMERS—To assist in trajectory analysis and guidance simulation problems. Strong mathematical background and experience on 7090 desired.

CIRCUIT DESIGN ENGINEERS—Interpret basic subsystem requirements, design and develop efficient and reliable solid state circuits to meet these requirements. MSEE with minimum of one year experience or BSEE and two years experience.

ADVANCED DIGITAL DESIGN ENGINEERS—Senior positions in advanced design of digital guidance computers that compensate for component failure. Investigations include techniques to permit self checking and self repair by the computer. Advanced engineering degree and 3-5 years applicable experience desired.

DIGITAL COMPUTER SPECIALISTS—Needed in a digital computer R&D laboratory to work on advanced computers for missile and space guidance applications. Openings in analysis and programming involving (1) development of numerical techniques, (2) error analysis, (3) participation in creating new special purpose computers, (4) development of computer programs used as aids in computer design, (5) software for specification purpose computers.

COMPUTER LOGIC DESIGNERS—Openings for experienced logic designer specialists to study design techniques and to do logic design research. Three years of applicable experience, plus BS or MS in engineering or mathematics required.

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A New Avenue to Management

Undergraduate education is being revitalized by stressing fundamental integrating concepts

BY JAY W. FORRESTER, '45
Professor of Industrial Management

LAST fall 12 juniors in the M.I.T. School of Industrial Management began their study of business in a new way. Their program emphasizes the dynamic interactions between the separate management functions. This new approach to management education should give the student a deeper insight into the industrial system and how different combinations of policies and structures can create different corporate patterns of stability, growth, and profitability.

The two-year, experimental program on which they have embarked was designed to give them a more fundamental view of systems relationships in business than they would acquire from a traditional approach to management education which concentrates on the separate functional areas of a business. Students will not receive academic grades in the usual way, although their work will be continuously evaluated by their teachers for individual guidance. A tutorial, seminar, and research basis replaces the usual class and lecture format. A great many problems of method and content remain to be worked out in the new program. In this process, the students, themselves, are participating. But the direction of the experiment and its basic rationale seem already to be producing a new enthusiasm and spirit.

Background

M.I.T. has been intensifying its effort to strengthen undergraduate education. Opportunities for improvement therein have been the focus of the Committee on Educational Policy during the last two years. In the 1961-1962 academic year, the M.I.T. Faculty voted the following change in its regulations to extend the responsibility and authority of the Committee on Educational Policy:

The Committee on Educational Policy is to encourage experimental innovation in undergraduate education. It shall have authority to approve limited educational experiments and to grant exceptions to allow any experiment to depart from specific Faculty Regulations and M.I.T. administrative procedures. The Committee on Educational Policy will seek appropriate advice about proposals from standing committees of the faculty and from the departments concerned. Descriptions of approved experiments and reports on their progress and outcome are to be circulated without delay to the entire faculty.

Within the scope of this mandate, the School of Industrial Management proposed in 1962-1963, and the committee approved, an experimental undergraduate management program for the junior and senior years that emphasizes the dynamic, systems nature of the business enterprise.

Business and economic systems are far more complex than the systems usually dealt with in engineering. The industrial system behavior grows out of interactions between large numbers of highly nonlinear variables. Yet, even the simpler engineering systems are far too complex to design by intuitive and descriptive methods and the trial and error processes that have been used to design industrial organizations. Until recently, the more powerful system design methods have not been adequate to cope with the complexities of social systems. The more powerful methods, consequently, have been applied to the simpler systems and the weaker methods to the more complex problems.

Teaching methods in the typical undergraduate business administration course have followed these same patterns of piecemeal analysis and functional description. The result has been a growing dissatisfaction across the country with the traditional methods of teaching business.

From recent research have come concepts which we believe may change management practice and revitalize undergraduate management education. A systems philosophy is emerging which can integrate the functional management subjects (marketing, finance, accounting, production, etc.), the human aspects, social and political pressures in the organization, the technical considerations, and the environmental conditions. Many of these underlying and integrating concepts have been borrowed from theory and practice in the fields of engineering and have been interpreted and generalized to serve in understanding present industrial systems and in designing new policy and structure for improving industrial performance.

These concepts arise from the theory of feedback systems, the better understanding of policy and decision-making in the systems context, simulation as a means to deal with systems too complex for analytical solution, and the availability of the high-speed digital computer.

It is now possible to interrelate in dynamic models the full scope of the descriptive information that is

available from observation and experience. Laboratory experiments in policy design in the industrial system have become possible with the same generality (and limitations) as laboratory experiments in engineering.

This experimentation can be founded on underlying principles of system behavior that transcend the details and nomenclature of the particular application. Systems concepts are emerging which are fundamental and common to all systems, whether these be economic, historical, sociological, managerial, engineering, biological or political. In the new M.I.T. program, we are striving for a framework and viewpoint which is pertinent far beyond the field of management. It is a framework which should be both conceptual and theoretical, and at the same time practical and useful. The fundamental principles of systems promise to provide an underlying basis for management as useful as the one that physics provides to engineering.

Philosophy of the Program

The business enterprise is an example of those complex systems that are goal-seeking and are governed through feedback control. For such systems, knowledge of the parts separately does not divulge the dynamic behavior; one must also know the implications of the way the parts are related by structure, time delays, and the policies that govern decision-making.

Dynamic studies of the corporation and its markets show, surprisingly, that the known practices of the organization can be the direct cause of its major difficulties. The management folklore is often completely wrong. Man's intuition is not reliable in anticipating the behavior of feedback systems of many variables, yet the important management policy questions involve nonlinear feedback systems of 20 to several hundred variables. Such systems create misleading indications. The causes of trouble symptoms are often remotely located from the symptoms and occur far earlier in time. To make matters more obscure, it is inherent that there are almost always nearby and recent apparent causes to which the troubles can be erroneously attributed. Models of corporate processes show how this can happen.

The enterprise has a policy structure with a tissue of information channels that control the flows of men, money, materials, orders, and capital equipment.* This orderly structure can, itself, create the fluctuations and crises that are usually attributed to external random events, and, in addition, the structure determines how the system will respond to the randomness that does exist. The differences between successful and unsuccessful organizations can be better understood. Management policies can be designed to enhance desired objectives.

With regard to the educational format, many students show far more maturity than they are permitted to exercise in the artificial environment of the typical undergraduate program. Intentional design could hardly have made the usual educational process less indicative of the challenges to be faced in later life. The successful manager or engineer is he who can ask the pertinent questions, yet in education the questions are given. After the question is formulated, the best man is the one who can organize a procedure for finding a method of solution and the necessary information, yet, in school, the necessary methods and facts have been supplied in advance. In most educational procedures, only problems that yield to the specified knowledge are encountered, yet, in life, the existence of an answer is uncertain. In the academic environment, work and examinations deal only with problems to which a nearby expert already knows the answer, thereby converting the challenge of the unknown into drudgery. Answers are not sought to be used.

For some students, study is better motivated by first encountering important problems followed by learning how to attack them. It is not necessary to put all basic materials first in a sequence of prerequisites that eventually leads to the interesting substance of the field. By contrast, society as a whole learns in the reverse order, first facing a need, at least partially meeting the challenge without fully comprehending the underlying reasons, and later penetrating the fundamentals as a basis for still greater progress.

Business education usually teaches the separate facets of business, leaving the student to generalize intuitively from these fragments. The process of integrating one's knowledge into a conceptual framework takes longer than learning the separate facts. A conceptual framework for the business enterprise should be an explicit part of education from the start, and not merely a capstone toward which a final gesture is made in a thesis or a course in corporate policy.

Description of the Program

The 12 juniors in the experimental program were selected on the basis of letters and interviews with those sophomores who applied in the spring of 1962. This group will continue several of the requirements of the normal undergraduate program—one subject per term in the humanities, an elective subject per term of their own choosing, and an undergraduate thesis. The remainder of their program is organized under a single subject registration of 27 units which is the equivalent of three normal subjects.

With one large block of time set aside, the program has the flexibility which has characterized the programs for the Sloan Fellows and the Senior Executives in the School of Industrial Management. Time allocation can be adjusted without the rigidities of subject and term boundaries. The format and pace can be changed to reflect the progress of the students.

Several closely related threads made up the program in the 1963 fall term—theory of system dynamics, laboratory projects in system simulation, study of the functional areas of management, readings in the current management press, weekly written papers, and evening dinner seminars with industrial leaders. The participating Faculty insures cohesiveness to these separate threads by working together in all the aspects rather than compartmentalizing their interests.

Systems theory builds from differential equations through Laplace transforms to sampled-data control to cover the linear dynamics of feedback systems. Analytical methods are not powerful enough to cope with the systems of interest to a manager, but the linear

* *Industrial Dynamics*, by Jay W. Forrester, '45, M.I.T. Press, 1961.

theory does provide a good background against which to judge more complex systems.

The laboratory simulation projects deal with systems of realistic complexity. These started with inventory and distribution system dynamics, continued to the instability of commodity markets and eventually will deal with the dynamics of corporate growth.† From models of systems, the student can learn part of what the manager learns from experience. But he can do more. By controlling the experimental conditions and observing the effect on system performance the student can gain insights that have previously been inaccessible.

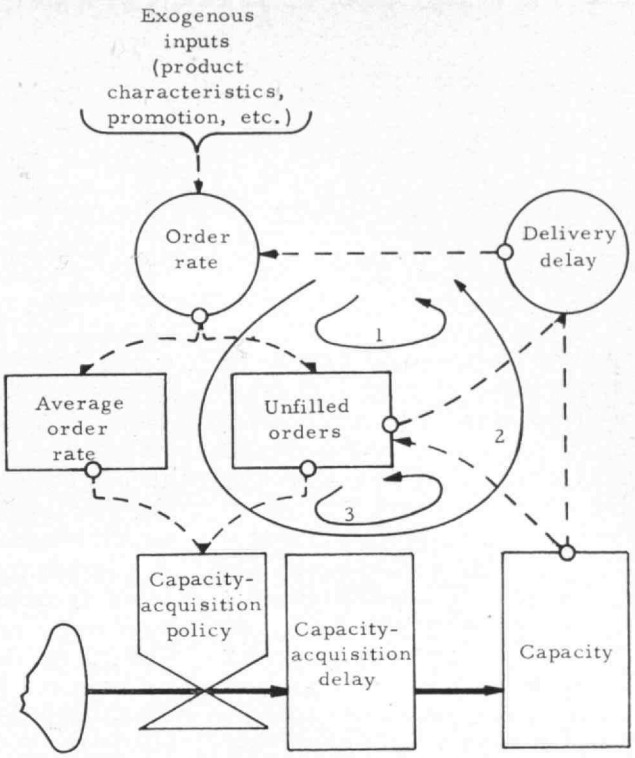
In the first term, the students have engaged in a preliminary reading of the textbooks normally required in the entire two years of the standard undergraduate program. This gives them an exposure to the functional areas of management—accounting, finance, marketing, production, and personnel. This gives an early introduction to the general nature of the material so that it can be found later for use in greater depth in laboratory projects and the weekly papers.

In a similar manner, the group reads regularly in the current business press. Each student subscribes personally to a daily business newspaper and to a weekly management magazine. This is to give exposure to systems interactions and the pressures on managerial decision-making more intimately than do the textbooks.

Each student writes a weekly paper requiring individual thought about the business system. The student chooses some subject found in two or more of the different threads of his activity. He might deal with an idea found in the management press which also is important in his system simulation project. He might show how systems theory throws light on some matter discussed in the standard management textbooks. He might relate some aspects of finance and managerial psychology. He should deal with similarities and contradictions found in his study of different aspects of the business system. The student brings this paper to his Faculty tutor who comments on the paper in depth. Was it a well-chosen subject, is an important point made, is the argument clear and forceful, how can the organization and writing be improved? Most students have never been led through the steps of writing a high-quality paper; they can reach the graduate school and a business career still unable to do so. There are indications that intensive tutoring can quickly and substantially improve the student's writing ability and his perception of his own writing weaknesses.

A regular part of the program for the Sloan Fellows has been a weekly dinner seminar meeting with an executive from the business world. This practice is being borrowed into the experimental undergraduate systems program to give the students firsthand contact with the men who face the problems of the industrial world.

The students have accepted the responsibility for arranging a series of seminars with Faculty members of their own selection. Drawing on the resources of the M.I.T. Faculty, student representatives of the group



An example of feedback relationships in business—those between order rate, forecasting in the capacity acquisition policy, capacity, and delivery delay as they can affect market growth. (From "Growth of a New Product, Effects of Capacity Acquisition Policies," by Ole C. Nord, '62.)

call on a Faculty member, help select a subject of current interest to the professor and the students and obtain a list of readings which the group studies prior to the seminar discussion. The unchanging, accepted, recorded facts are best obtained through individual study. The fresh, controversial frontier of a field is best explored in a seminar discussion. The emphasis here is not on the routine background material of the field which the students can read, but instead is on a timely matter of importance, either in the staff member's research or his outside contacts.

The students in the experimental program will receive no grades in any of their subjects during the junior and senior years. Grades are often viewed as reward or punishment with an overtone of forcing rather than inspiring high performance. They become an end in themselves, biasing the educational process toward quizmanship rather than education. Grades should be an information feedback to the student, telling him how to correct his learning process but in this they are inadequate. Instead of grades, in his weekly tutorial conference, in his projects, and on the basis of his seminar discussions and presentations, the student is advised on the standards of achievement toward which he should strive, his attitudes, and his study and research methods. In addition, a written analysis is given him periodically for his guidance. A rising student maturity, self-discipline, and initiative are already evident. Performance is motivated not by the minimum that will receive a good grade, but by a desire to make effective use of limited time in achieving an understanding of the business process.

†*Growth of a New Product, Effects of Capacity Acquisition Policies,* by Ole C. Nord, '62, M.I.T. Press, 1963; and *The Dynamics of Research and Development,* by Edward B. Roberts, '57, Harper & Row, Inc., 1964.

A Veil in Space Reveals Itself

New techniques and apparatus disclose oxygen bound to hydrogen in space between the stars

THE STARS are veiled from us by enormous quantities of very scattered material, some of which M.I.T. researchers last fall showed radio astronomers how to detect. This particular material is oxygen combined with hydrogen, in a neutral radical OH, and its presence in interstellar space can be detected at two frequencies, 1667.35 and 1665.40 megacycles per second, corresponding to wave lengths of about 18 centimeters.

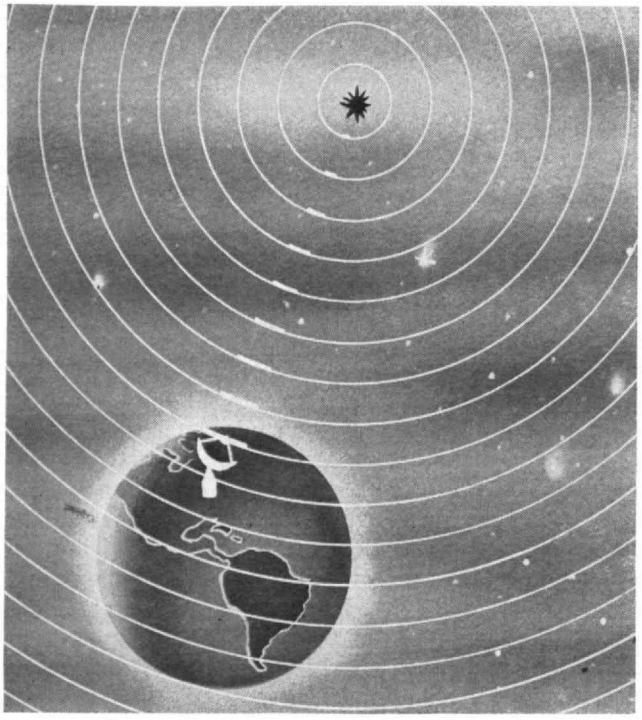
Radio frequencies between 1660 and 1700 megacycles are used now in meteorological work and satellite communication, but radio astronomers also have a claim staked to them—and are likely to press that claim more vigorously henceforth now that the usefulness of those frequencies to them has been proven.

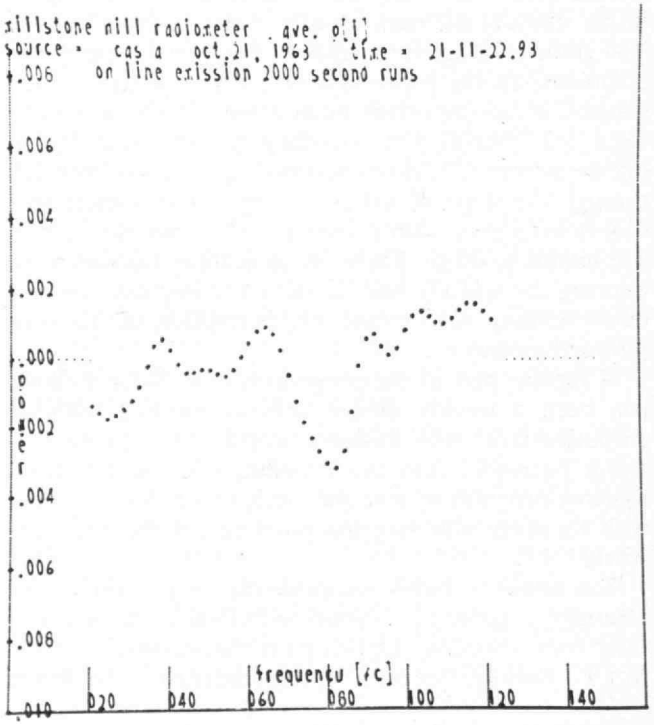
The similar discovery of a means of detecting hydrogen in space in 1951 resulted in great advances in radio astronomy, but until last fall nothing except hydrogen had been identified in space by radio telescopes. Hydrogen atoms disclose their existence at a frequency of 1420 megacycles per second, a wave length of 21 centimeters. By studying the sky at that frequency, astronomers have traced great clouds of hydrogen and discovered previously hidden details of the structure of our galaxy.

As much material is now believed to be strewn between the stars as in them. The M.I.T. research indicated, however, that only one out of 10,000,000 of the hydrogen atoms in interstellar space is bound to an atom of oxygen. The detection of the OH radical required much more sensitive equipment and sophisticated techniques than the detection of hydrogen atoms. Yet it suggested that other forms of material may also be detectable later on.

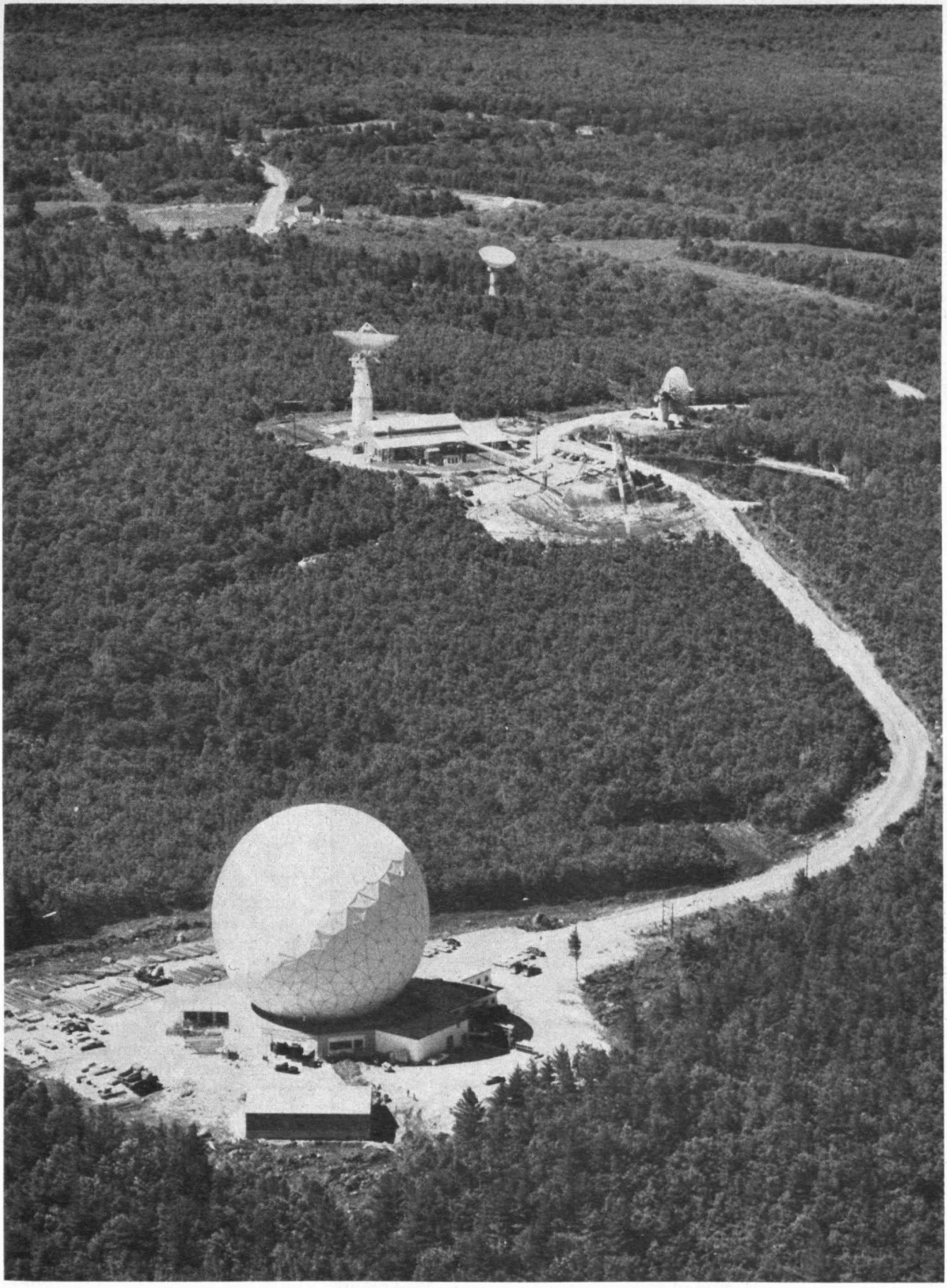
Optical observations have indicated that many elements (calcium, titanium, sodium, potassium, and iron) and radicals (CN and CH), in addition to hydrogen and OH, are drifting between the stars. The radio frequencies at which these forms of matter will disclose their presence are not known yet, however, with enough precision to enable radio telescopes to locate them.

The OH radicals revealed their existence by causing a dip in the power spectrum of radio emissions from Cassiopeia A, a star a hundred million billion (10^{17}) miles away from us. That star's emissions were





THE OH RADICALS in interstellar space revealed their existence by absorbing some of the energy emitted by a star. This caused a dip in the power spectrum of emissions from that star which were picked up by an antenna on earth. That spectrum was determined by mathematical techniques with a computer's help.



OH WAS DETECTED with the big antenna pointed upward in this picture of the Lincoln Laboratory Millstone Hill Observatory. Beyond it is one built for Project Westford; at the right, a smaller tracking antenna; and in the foreground is the 15-story-high radome in which the even greater Haystack radar is being built.

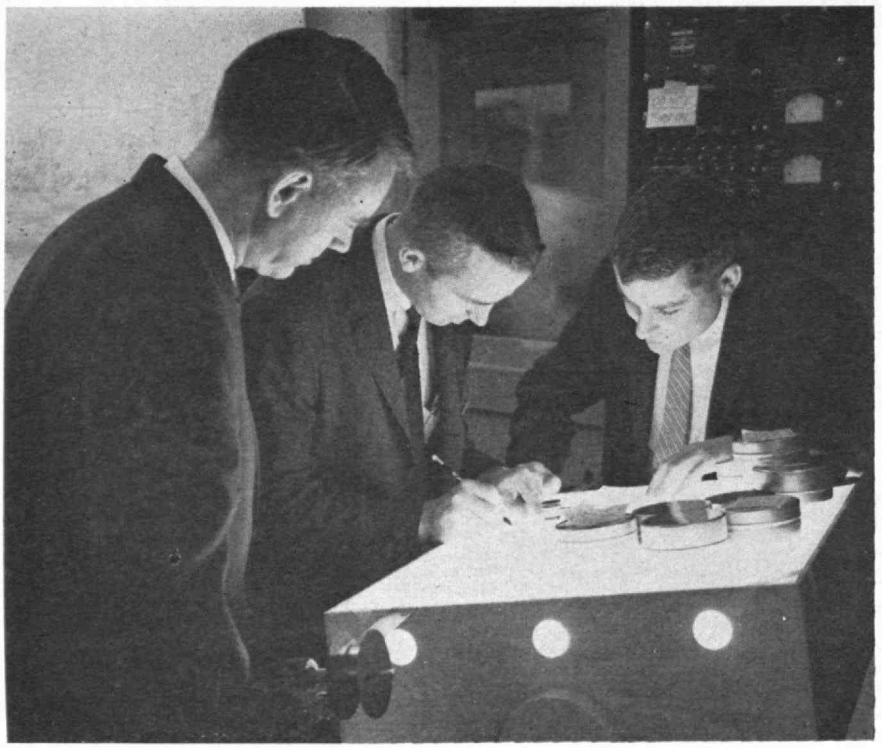
picked up by an 84-foot antenna at Lincoln Laboratory's Millstone Hill Observatory. They were amplified in the receiving apparatus there, sampled, correlated in a radiometer, and finally transformed by a computer into a graph which revealed the expected dip where the OH had absorbed energy from the star's output.

Associate Professor Alan H. Barrett of the Research Laboratory of Electronics and M. Littleton Meeks, Sander Weinreb, '58, and John C. Henry of Lincoln Laboratory were the men in charge. Their success, however, was the culmination of a series of achievements in which many others played essential roles.

Professor Edward M. Purcell and Harold I. Ewen first detected hydrogen in space with a small radio telescope that they built at Harvard. Their work inspired many others, including Meeks and Weinreb. The latter, while still an undergraduate at M.I.T., explored the possibility of detecting heavy hydrogen as well as ordinary hydrogen in space, and later, while working for his doctorate, developed the correlation radiometer which was used in the detection of the OH radical. Meeks met Weinreb at a Harvard seminar, and joined the Lincoln Laboratory staff in 1961 because of the potentialities for astronomy that he perceived in the data-processing techniques being developed there. Henry was one of the men responsible for the computer built at Lincoln Laboratory that was used in the search for OH.

Professor Barrett had looked for OH, in vain, before joining the M.I.T. Faculty. He and Edward Lilley, who is now at the Harvard Observatory, tried to detect that radical in space while they were working at the Naval Research Laboratory in Washington in 1956. They failed then, largely because of uncertainty as to the frequencies at which OH would absorb energy. Those frequencies were determined three years later in a Columbia University laboratory by G. Ehrenstein, M. Stevenson, and Charles H. Townes, who is now M.I.T.'s provost.

In addition to knowledge of exactly where to look for OH to drain energy from the emissions of a star, the successful searchers last fall drew on studies of information theory in the M.I.T. Research Laboratory of Electronics and applications of that theory at Lincoln Laboratory to radar and communication systems.



EXAMINING photographic film of the evidence of OH are (from left) M. Littleton Meeks, John C. Henry, and Sander Weinreb, '58, three of its discoverers, at Lincoln's Millstone Hill Observatory.

The Millstone Hill antenna used to receive the radio emissions of Cassiopeia A was built originally to study radar tracking of ballistic missiles, and was the testbed for many components of today's Air Force radars. Linked with it is a computer, with which the data processed by the radiometer in the course of a 2,000-second run could be analyzed and presented graphically six seconds later.

The actual search began on October 15 and evidence of OH was obtained in the first run, but the experimenters continued to observe the emissions from Cassiopeia A through October 29, while the earth moved in its orbit around the sun. These runs revealed a slight shifting in the OH absorption frequencies, and thus proved that the material they were detecting by the dip in the power spectrum was far out in space rather than in the earth's atmosphere.

The radical that they detected would become a molecule of water if it chanced to meet another hydrogen atom, as must sometimes happen, so the discovery of it suggested that there are bits of water in parts of the universe which were long supposed to be empty. But this was less sensational news for astronomers than the demonstration of techniques by which more may be learned about components of the thin veils of material in interstellar space.

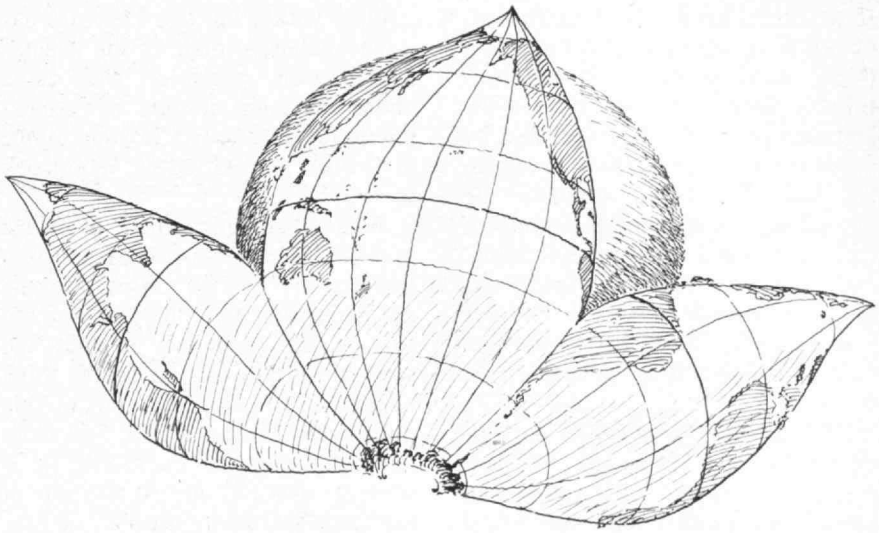
The day after a letter reporting the detection of the OH radical was sent to *Nature,* Professor Barrett of the Research Laboratory of Electronics reported it to a committee of the National Academy of Sciences in Washington. That committee promptly cabled an American representative at a meeting of the International Telecommunication Union in Geneva which was concerned with frequency allocations. He, in turn, immediately conveyed the news to the Dutch astronomer, H. C. van de Hulst, whose theoretical work more than 20 years ago had prompted Purcell and Ewen to start the search for interstellar material with radio telescopes.

Key support for the Lincoln Laboratory work in this field came from the Air Force, and Professor Barrett's participation in it was supported by the National Aeronautics and Space Administration.

The Origins of the Ocean

Earth scientists suggest that the rocks rather than rain supplied the water, and that volcanoes have helped fill it with antifreeze

BY WILLIAM S. VON ARX, '55



ABOUT 250 years ago Count Luigi Ferdinando Marsigli published a book on oceanography. He was an Italian working under the auspices of the French Academy of Science and his book was published in Holland. In the preface, he said in effect that the seas are so complex that a wise man would hesitate to undertake their study—so you see my position.

The ocean is a conspicuous feature of the earth but comprises only a small part of its bulk. The ocean is very accurately represented on a classroom globe, the kind that's covered by paper, by the thickness of the paper used to cover the sphere. It really has significance only because it is spread out so very much. About three-fourths of the earth is covered with water, but it is just a film. That such a thin film can be supported by the earth without serious mishap—the ocean does not slosh around much—is indirect evidence that the earth, in its orbital motion around the sun and in its rotation, is a very steady body.

A Mercator projection of the world tends to make us think of the ocean as "the seven seas," but it may also be viewed as a single system. The so-called petal projection suggests that the world ocean has a core around Antarctica, and three main branches—the Indian branch, the Atlantic branch, and the Pacific branch. Thus the seas are wrapped around the solid earth very much like the petals of a flower.

Even though the world ocean is extremely thin, it is layered and the layers persist over about two-thirds of the earth. This layering is pronounced, and the layers have different characteristic temperatures. The surface temperature averages about 20 degrees C. The Polar seas, of course, are very cold, but the tropical seas are warmer. The warm surface layer of tropical and middle latitudes comprises about 7 per cent of the ocean, composed of water between 10 and 20 degrees C.

Below the warm surface layer, in 17 per cent of the ocean, the temperature drops very swiftly to four degrees C. This is known as the thermoclime region, because the vertical temperature gradient is very steep. In the 76 per cent of ocean below this region, the temperature ranges from four degrees C. to below zero. Sea water's temperatures can be below zero, about -1.8, because of the salt antifreeze that it contains. So the ocean is, in general, really very cold. Only its surface is warm.

This layered temperature structure is found everywhere between latitudes 60 degrees north and south of the equator. The surface water is cold toward the poles where water sinks and floods the bottom of the rest of the ocean. So there is a struggle between the water that is sinking in polar regions and that in equatorial areas where the sun is heating the surface and making the warm layers thicker. This conflict of motions gives the world ocean its characteristic structure.

But the ocean, as we observe it today, was probably not always like this. We are coming out of a period of glaciation, or may be still in it. There is a tendency in high latitudes at the moment for the melting ice on Antarctica and Greenland to contribute a freshness to the deep and bottom waters which may not be characteristic of most of geologic time. Today the salt content of the ocean diminishes with depth and thus follows the same curve as the temperature curve. But in the geologic past there may have been a more nearly uniform distribution of salt from top to bottom.

I would like to discuss now:

► How old are the oceans?

► Where did the water come from?

► And where did the salt come from?

We know that the earth must have been formed before there were

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THIS ARTICLE was drawn from Professor Von Arx's lecture at M.I.T.'s first annual Alumni Seminar in Cambridge last fall.

oceans, so their age cannot be more than 4.5 billion years. The oldest rocks are about 2.8 billion years old. Carbon 14 dating, however, gives the ocean an age of only 400 years, and we know that's too short. So the best, most reasonable way to approach the problem of the ocean's age would seem to be one proposed in 1715 by the astronomer, Edmund Halley.

Halley's method was this: Suppose we know the dimensions of the ocean and how salty its waters are. If we could gauge the contributions of salt from rivers, by assuming that those contributions have been continuous through geologic time in the amounts presently observed, and by assuming that the ocean was initially fresh, we could estimate the ocean's age by dividing the total salt content of the oceans by the annual salt contribution of the world's rivers. Halley couldn't do this because in his day people didn't know how voluminous or how salt the seas were.

The British *Challenger* expedition of 1872-1876 provided the necessary information. In 1899 Joly made such a calculation and found the age of the oceans to be 100,000,000 years. But we know from marine forms embedded in rocks that oceans have been around for about 500,000,000 years. Fossils in the Belt Mountains of Montana are more than 500 million years old, and contain evidence that there must have been salt water present when they were formed. So there was something wrong with Joly's computation. The rate at which salt is being distributed by rivers is too fast to give anyone using his method a reasonable answer.

There are two explanations: One is that we are not living in characteristic times; in other words, that the meteorological situation of the present world is different from the average of geologic time. Another argument is geological: The land is now reasonably rugged, and the amount of materials washed into the sea by rains may be abnormally large.

Only within the last 15 years has a reasonable estimate of the ocean's age become possible. This came about through studies of atmospheric chemistry by Christian Junge in Sweden and Alfred H. Woodcock in the U.S.

What happens when a wave breaks? When a wave breaks at sea, bubbles are carried down into the sea and gradually come back to the surface. As a bubble reaches the surface and breaks, a funny thing happens. The top of the bubble pulls aside like an eyelid, and from the bottom of the bubble, a jet is shot up into the air. At the top of that little jet, a tiny droplet, or two, or three, can be broken off and carried away by the winds. The little jetlets from millions of breaking bubbles all over the ocean carry sea salt into the atmosphere which then dries out into little crystals of salt. If these little crystals of salt get into moist air, they will collect water from the air, since sea salt is highly hydroscopic, and fall as rain. Thus it may supply salt to a river. If you take this cyclic process into account, depending upon the numbers you use, you can push the ocean's age back to where it ought to be. It's not a satisfactory state of affairs, but to the best of our knowledge the oceans have been with us since the beginning of the fossil record. I think we can probably say that, but not much more.

Where did all the water come from? The Biblical legend has it that it came in 40 days from rain. That could not have been true at present temperatures. Fully saturated, the present atmosphere can hold as water vapor only 13,000 cubic kilometers of liquid water—and the oceans contain 1.3 billion cubic kilometers of water.

We can also go at this problem another way, and consider what might have been the case if the present amount of water in the ocean once was above the surface of the earth and had a volume of 1.3 billion cubic kilometers. If we go back far enough, we can think of the earth's surface as being molten rock. Molten rock, ordinary rock, has a melting point of about 1200 degrees C. At that temperature there could certainly be 1.3 billion cubic kilometers of very hot water and steam in the atmosphere. But it would extend roughly 12,000 kilometers up in the sky.

At that level water vapor would be so high that it would have the velocity of escape and about 2 per cent of the molecules would never come back to the earth. If the condition lasted long enough, i.e., if 2 per cent loss were compounded continuously, it would wipe out the balance in a short time. Another thing that would happen is that the intense bombardment of high-energy particles and solar radiation would dissociate the water into atomic hydrogen and oxygen. These atoms could have a higher velocity and disappear even more rapidly into space. So it doesn't seem likely that the whole ocean was ever supported as a vapor over the earth.

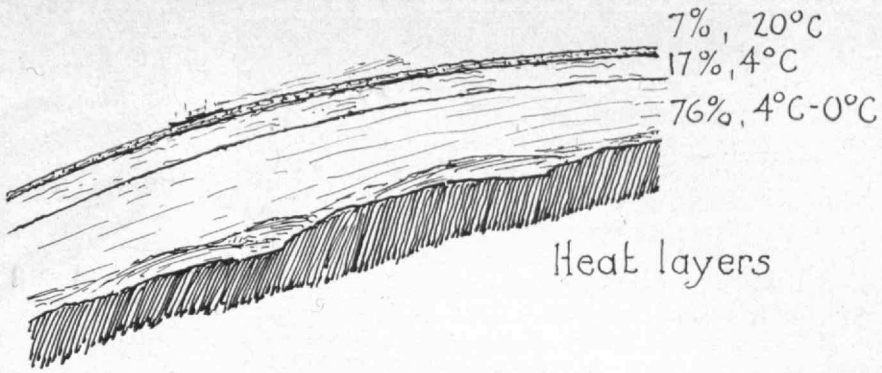
Where, then, did we get the water from? It turns out from some work done in 1931 by R. W. Goranson at the Geophysical Laboratories in Washington, that ordinary rock substance such as basalt will release water crystallized from a molten state. The basaltic crust underlying the oceans is about five kilometers thick. If you melt rocky substances

and expose them to water they will take on 5 to 8 per cent water by weight, and when you freeze them again they will release that water. If the primordial material of which the earth was made contained water to the capacity of the rocks, the cooling process and the formation of the crust might have freed water.

This seems a reasonable possibility. The land area of the earth is 150 million square kilometers. The water area of the earth is 360 million square kilometers. The thickness of the continental areas is about 33 kilometers and the thickness of the crust under the ocean about five kilometers. This is a total of 8 billion cubic kilometers of crust. This material presumably was derived from molten interior sources by a gravitational fractionation process and cooled. If it contained 5 per cent water, it could have freed 500 million cubic kilometers of water on the surface of the earth. We're getting close, but this still leaves us with a big discrepancy.

But perhaps we didn't call our shot deep enough. If the mantle material from below the crust is the proper source for the water in the ocean, how deep do you have to go? And how deep can you go legitimately? You have to go down something like 600 kilometers to get enough water to fill the oceans from this source. Is there any geologic or geophysical evidence that this is a reasonable distance?

Yes, mainly this: Earthquakes are found to depths as great as 700 kilometers. These are very deep-focus earthquakes, which means



Heat layers

that the upper part of the mantle must be a material that is stiff enough to break. In an earthquake, two blocks slip, and the energy of their fall is released and comes to the surface. It seems reasonable to assert that down to the level of deep-focus earthquakes we have rocky material in the earth that is cool enough to be crystalline, and from which water may have been released to reach the oceans.

It's a fairly tight argument so far, but how did the water get to the surface? Presumably through volcanic eruptions. We know there have been geologic periods when there was widespread volcanism. So that isn't too hard to accept.

In addition to the water that comes up out of volcanoes, there are other substances, and these, lo and behold, appear in the oceans, too! These other substances are in the salt of the sea—fluorine, chlorine, bromine, iodine. All come out of volcanic emissions. We know that these are in gases coming out of volcanoes because of the work of C. N. Fenner and E. G. Zies in Alaska. They made careful gas analyses of the discharge of fumaroles around Katmai.

Their work has given us a clue as to where the salt in the ocean came from. With the volcanic water we got the chlorides—a principal constituent of sea salt is chlorine—leaving only the source of sodium magnesium to be explained and so on. One of the interesting things about sea salt is that it contains sodium and chloride in different proportions than they are found on the dinner table. The salt in the sea, therefore, couldn't have come from a salt bed. The sodium ions must have come in separately.

If the chloride came from volcanoes, the sodium could easily have come from the weathering of the rocky crust. This is the present state of thought on this matter. But there could be a joker in this argument. Most modern volcanoes border the oceans, so possibly the people studying their emissions have been looking at revaporized sea water. It leaves you a bit shaken to come face to face with this possibility after such a hopeful beginning.

Maybe Marsigli was right!

Formation of sea salt nuclei

Trend Of Affairs

The Buildings Going Up At the Institute

THIS YEAR will bring the greatest change in M.I.T.'s appearance since it moved to Cambridge from Boston in 1916. Construction of three interdisciplinary centers and a new Student Center began in 1963, and construction of two more academic centers will start in 1964.

The Green Center for Earth Sciences reached its full height of 277 feet in November and will be completed this year. It is the tallest building in Cambridge, and the 125,000 square feet of space provided by its 20 stories will be used for teaching and research in geochemistry, geology, geophysics, meteorology, and oceanography. On its roof an array of modern sensing devices, including a major radar and instrument tower, will be free from interference by surrounding buildings.

The Center for Materials Science and Engineering, on which work is proceeding in what was formerly the main parking lot back of the great dome, will house research projects concerned with the electrical, magnetic, optical, mechanical, and chemical properties of materials and their exploitation in new devices. It will be five stories high and provide 180,000 square feet.

The Center for Life Sciences, on which work began late last fall, will be an extension to the Dorrance Laboratory. It will provide 135,000 square feet of space for research regarding cancer, viral diseases, tissue culture, genetics, molecular biology, biophysics, nutrition, and food science.

Across Massachusetts Avenue, where the drugstore and WGBH used to be, work is under way on a four-story, 150,000-square-foot Student Center. It will provide dining rooms and space for student organizations and commercial concerns. The Harvard Coop's Technology Store will move into it, have nearly twice as much space as at present, and use much of this space to greatly enlarge its book section.

The centers for Materials Science and Engineering, for the Life Sciences, and for students are not scheduled to be completed until 1965. By then, construction of two more centers will be under way.

One of these will be the Center for Space Research on Vassar Street, adjacent to the Metals Processing Laboratory. It will bring together in about 100,000 square feet the Institute's projects related to space.

The other will house the new Center for Advanced Engineering Study. It will face Massachusetts Avenue, between the north wing of the Rogers Building and the Guggenheim Aeronautical Laboratory, and will provide 55,000 square feet of space for the new program for practicing engineers and professors of engineering.

To help ease the parking congestion caused by all this expansion, a new garage is under construction west of Massachusetts Avenue on Vassar Street. It will hold about 400 cars and is scheduled to open early in 1964.

THE FLAG RAISING atop the new Green Center for Earth Sciences was photographed by John Torode, '66, against Boston's new sky line. Lights are on now in the high building into which M.I.T. people will move soon.

IN KENDALL SQUARE, the old Daggett building is being extensively remodeled to house many M.I.T. offices for which there no longer will be space in the main buildings despite the additions now being constructed.

Learning and Leadership

M.I.T.'s students and Faculty filled the Kresge Auditorium on the morning of November 25 to mourn the death of President John F. Kennedy, and hear tributes to his memory by President Julius A. Stratton, '23; A. Jerry Luebbers, '64, representing the students; and Father Harry J. Dooley, speaking for the Institute's religious counselors. No classes met that day and the Alumni Council's meeting that evening was canceled.

In the address that President Kennedy had prepared for delivery in Dallas, he had emphasized that "leadership and learning are indispensable to each other," and had planned to congratulate the community on the establishment of the Graduate Research Center of the Southwest. "It is not a coincidence," his text said, "that those communities possessing the best in research and graduate facilities—from M.I.T. to Cal Tech—tend to attract the new and growing industries. . . .

"This link between leadership and learning is not only essential at the community level. It is even more indispensable in world affairs. . . . In a world of complex and continuing problems, in a world full of frustrations and irritations, America's leadership must be guided by the lights of learning . . .

"We in this country, in this generation, are—by destiny rather than by choice—the watchmen on the walls of world freedom. We ask, therefore, that we may be worthy of our power and our responsibility . . . For as was written long ago: 'Except the Lord keep the city, the watchman waketh but in vain.' "

Food Canning's Pioneers

CHARLES OLIN BALL, who retired last June as head of the Food Science Department at Rutgers University, and the late Professor Samuel C. Prescott, '94, and William Lyman Underwood, '98, were honored at M.I.T. last November when Dr. Ball delivered the first Underwood-Prescott Lecture.

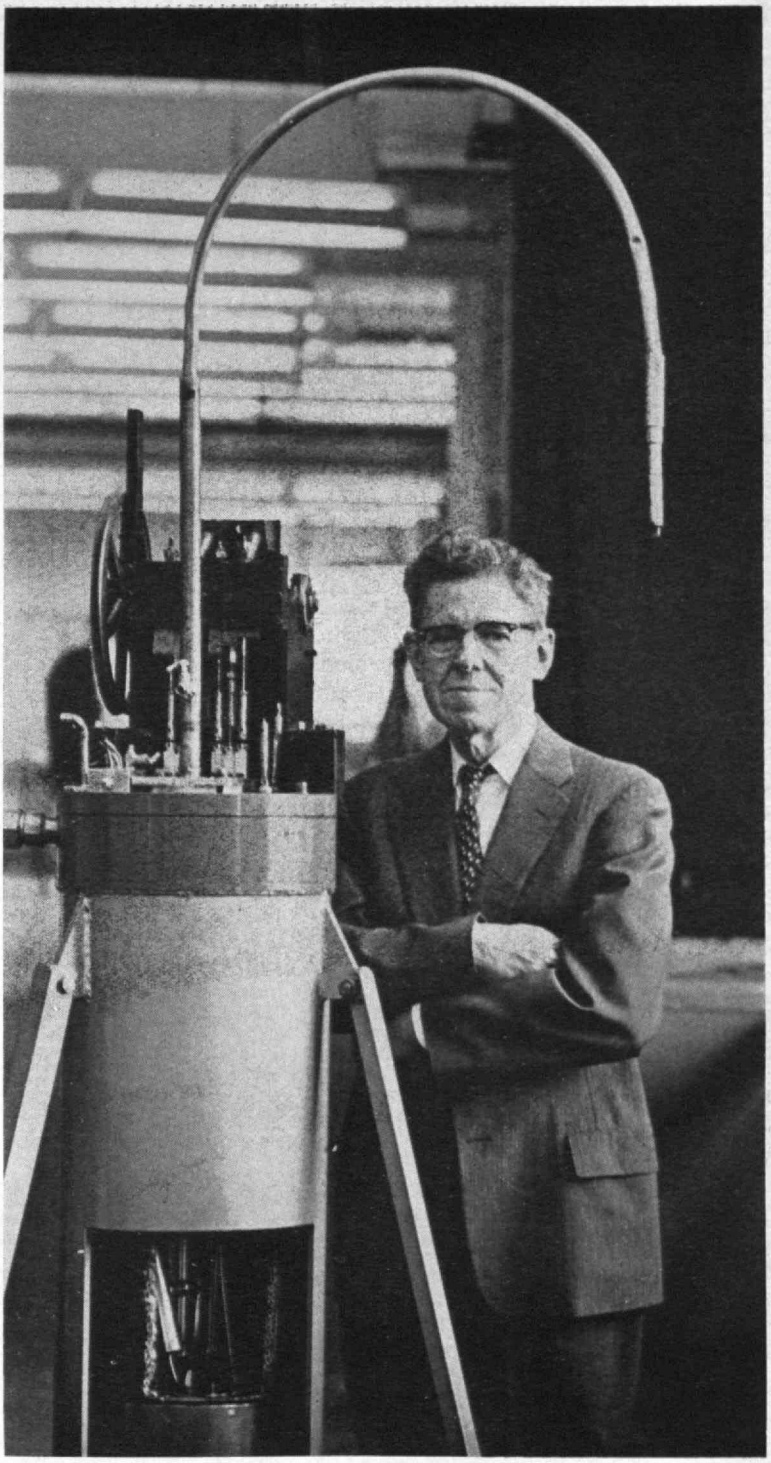
Dr. Ball was honored for providing a "mathematical cookbook" for the canning industry, and in his lecture he declared that a scientist should be willing to adopt a "practical" or unsophisticated approach to research. Recalling his own education, he said, his goal had been "to become a scientist—not a chemist, not a physicist, not a mathematician, not a food technologist," and he warned his audience against the perils of ultraspecialization.

Professor Samuel A. Goldblith, '40, chairman of the committee that chose Dr. Ball to receive a scroll and honorarium, pointed out that the processing of 26 billion cans of food a year, in this country alone nowadays, is evidence of the significance of the research done by the pioneer food scientists.

George C. Seybolt, President of the William Underwood Company, also spoke and declared that the industry must increasingly contribute to university research.

M.I.T.'s TV Program Honored

THE Western Electric Fund has given a special award of $2,000 to WGBH, Boston's educational TV station, for the M.I.T. "Science Reporter" program conducted by John T. Fitch, '52. Western Electric presents such awards to educational institutions and projects that it considers of especial merit, and cited this program for "furthering academic excellence."



Professor S. C. Collins and his historic helium gas liquefier.

A Gift to the Smithsonian

A COLLINS CRYOSTAT was given to the Smithsonian Institution last month by Loyola University, of New Orleans, and Arthur D. Little, Inc. This helium gas liquefier built at M.I.T. in 1947 by Professor Samuel C. Collins and his associates Charles F. Squire and Howard O. McMahon, '41, greatly reduced the difficulties of cryogenic research. Arthur D. Little, Inc., undertook its production and has supplied more than 250 such machines to laboratories throughout the world. The one given to the Smithsonian was used first at Rice University and later at Loyola, which now has a newer one.

Dust High in the Sky

SCIENTISTS in M.I.T.'s Research Laboratory of Electronics, using a laser as part of an optical radar, have detected minute particles, presumably dust from meteoric fragmentation, in the uppermost portions of the earth's atmosphere. Their findings, reported in a letter to the British science journal, *Nature,* add support to the theory that very small meteors shower into the earth's atmosphere continuously and do not burn up but, instead, fragment into still smaller particles that eventually settle to earth.

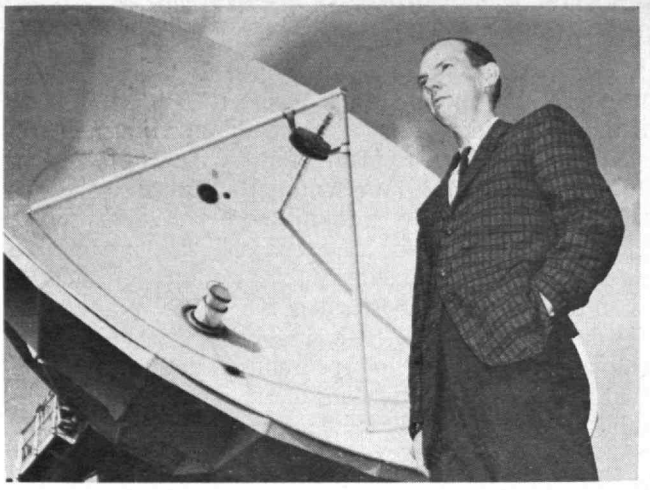
Giorgio Fiocco, Assistant Professor of Geology and Geophysics, and Louis D. Smullin, '39, Professor of Electrical Engineering, observed optical echoes from minute particles at heights of from 60 to 140 kilometers (35 to 85 miles). Concentrations, they said, appeared in two regions—one around 80 kilometers (50 miles) and the other around 120 kilometers (70 miles).

"In the absence of independent methods of observation we cannot say what causes these echoes," they said. "However, one is tempted to compare the lower echoes (approximately 80 kilometers) with the observed heights of noctilucent clouds. We speculate that the more distant echoes (approximately 120 kilometers) correspond to the region of meteoric break up."

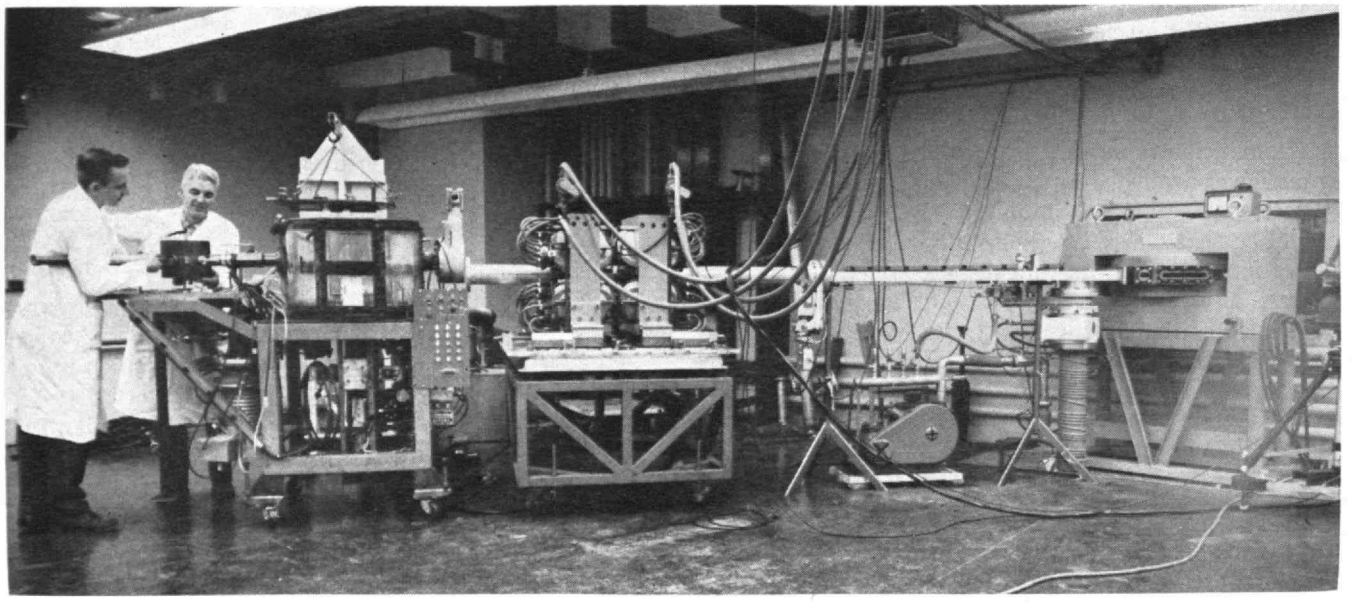
Professors Fiocco and Smullin performed the experiments during the summer from an observatory building at Lincoln Laboratory. Dr. Fiocco and Giuseppe Colombo of the University of Padua, Italy, who is now at the Smithsonian Astrophysical Observatory, are working on a detailed interpretation of the data.

In April, 1962, Professors Smullin and Fiocco beamed light from a laser to the moon and detected reflections back to earth. Their more recent experiments extended this radar application of lasers. In these, they beamed bursts of light from a laser directly upward through one telescope and detected reflected echoes in a second telescope. A photomultiplier unit was used to amplify and record the echoes. Altitude of particles producing the echoes was determined by automatic measurement of time between transmission and reception—66 millionths of a second for each 10 kilometers.

The optical radar consisted of a Radio Corporation of America ruby laser delivering light pulses lasting only 50 billionths of a second at a 10-megawatt power level and a wavelength of 6,940 angstrom units; a transmitting refracting telescope of 7.5 centimeters diameter and a 201-centimeter focal length; and a receiving reflecting telescope of 32 centimeters diameter and a 270-centimeter focal length. The telescopes were precisely aligned on a common equatorial mount.



LINCOLN LABORATORY has awarded Walter E. Morrow, Jr., '49, a citation and $2,500 prize "for his imaginative contribution to a new concept of intercontinental microwave communication by means of orbiting metallic dipoles and his skillful, persevering guidance of the research and development that translated the concept into a successful experimental test." He is shown with a 60-foot antenna developed for the experiment.

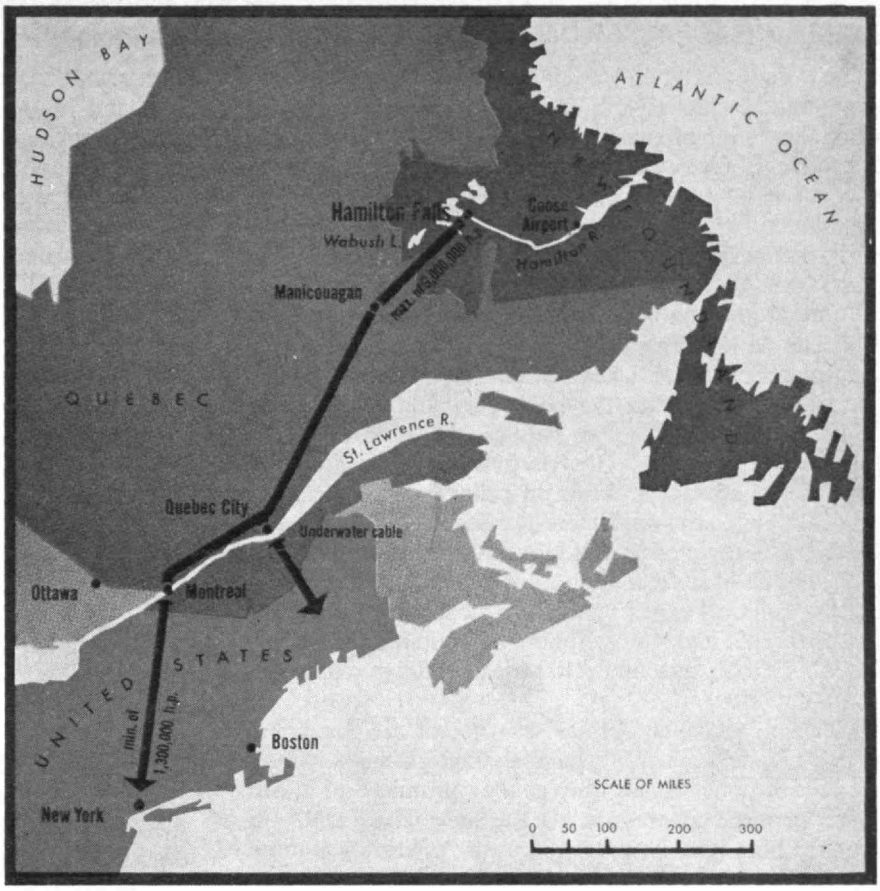


THE EXPERIMENTAL AREA of the M.I.T. Laboratory for Nuclear Science cyclotron has been so enlarged that time-of-flight and other experiments now can be performed readily in it. The cyclotron's business end is behind the wall at right. A bending magnet deflects fast-moving particles into experimental apparatus. Technicians are seen installing a scattering chamber to count particles deflected by various atomic nuclei.

Power from Newfoundland

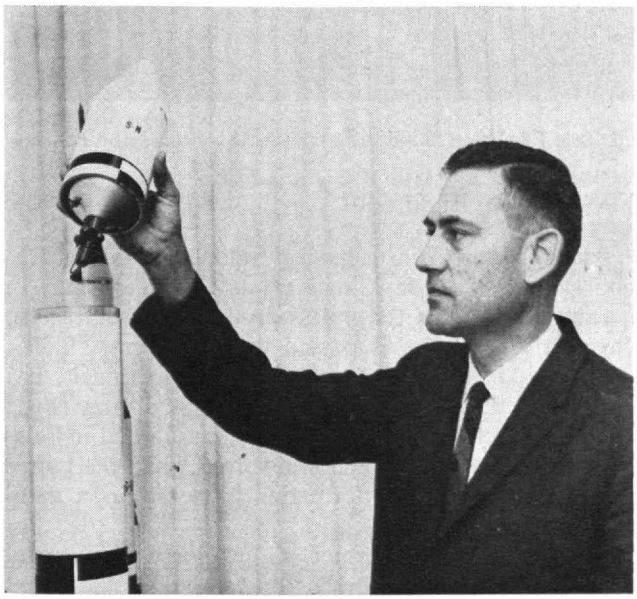
CANADA's next big boom, according to the November 16 issue of *Maclean's* Magazine, will be started by harnessing Hamilton Falls, 750 miles northeast of Montreal. The British Newfoundland Corporation (BRINCO), of which Robert H. Winters, '33, is chairman and chief executive, will begin developing this hydro site next spring. The work is expected to continue for seven years, cost an eventual billion dollars, require employment of 5,000 men, "and unleash a new surge of related industrial activity in northeastern Canada."

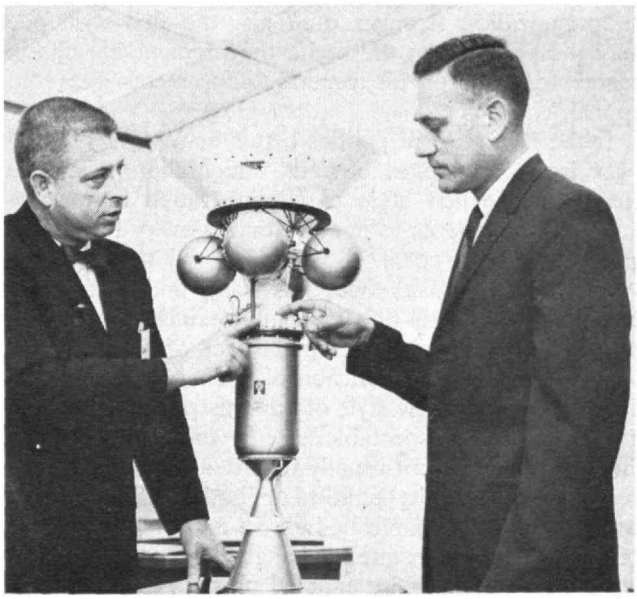
BRINCO engineers estimate, according to *Maclean's,* that Hamilton Falls has a power potential of six million horsepower, which greatly exceeds that of the Grand Coulee Dam, and expect power from this wilderness source to be lighting the marquees of Broadway by the 1970's. Financing of the great development, the magazine reports, will be handled largely by Morgan Stanley and Company and N. M. Rothschild and Sons.



Mr. Winters, who is this year's President of the M.I.T. Alumni Association, is a director of 13 major Canadian corporations, and chairman of the board of Rio Algom Mines Limited. The article hails him as one of "the Canadian economy's dominant decision makers," and reviews both his political and business activities. He entered politics at the urging of the late C. D. Howe, '07, and was a Liberal cabinet minister in the St.Laurent administration. Harland C. Forbes, '23, is mentioned among those with whom his acquaintance has helped him advance the Newfoundland project.

"The exploitation of these great resources will certainly keep even a man of Winters' talents fully occupied," says Peter C. Newman, the author of the article in *Maclean's.* "But many of his associates are convinced that he will eventually return to politics."





LT. COL. ROBERT C. BROUNS, '51, a member of Wernher von Braun's rocket development team at Huntsville, Ala., is working on the RIFT (Reactor-in-Flight Test) Project. He is seen above placing a model of a nuclear-propelled upper stage on a Saturn V model, and at the right discussing a nuclear engine called NERVA with a colleague. Procedures are being developed now for static tests of RIFT stages in Nevada.

Middle-Class Politics

CITY GOVERNMENT in the United States is taking on a new "middle-class style." There is growing hostility toward the "odor of smoke-filled rooms," the lower class is producing fewer successful politicians, and the influence of civic associations, the press, and others who profess *expertise* is increasing.

Two Harvard political scientists, Edward Banfield and James Q. Wilson, spot these trends in a new study of *City Politics* published by Harvard University Press and The M.I.T. Press. Professor Wilson is director of the Joint Center for Urban Studies sponsored by Harvard and M.I.T., and the book grew out of its work.

The major trend in city politics, the authors say, is the change from the "old-style politics of the boss and machine," with its emphasis on private gain, to a middle-class style stressing interest, efficiency, and competence. "The logic of the middle-class ideal requires that authority be exercised by those who are 'best qualified,' that is, technical experts and statesmen, not 'politicians.' It encourages the consumption of 'public goods' like schools, parks, museums, libraries, and by extension, urban renewal. . . .

"The old style of politics was not at all concerned with principles or ideology, and characteristically it took account of policy issues only as they promised to afford some private advantages." (The new style tends to produce boredom, however, because "politics was more exciting as a 'game' than it is as 'service' to the community.")

"The old-style politician had no incentive to try to confer benefits on the public at large. So long as he gave jobs and favors to the right people he could maintain his organization and get the votes he needed. The new-style, 'good government' politician must employ other means. . . . He must use charm and salesmanship or else offer inducements to large classes of people or to the whole public . . . (But) whereas the old-style politician could withstand almost anything except an organization stronger than his, the new-style one may disappear from the scene the moment his charm ceases to work or his general inducements cease to appeal."

Is the new style of politics better or worse? The answer is by no means obvious, the authors say. The virtues of the new style of administration may "produce a ratio of costs to benefits that is every bit as bad and perhaps even worse.

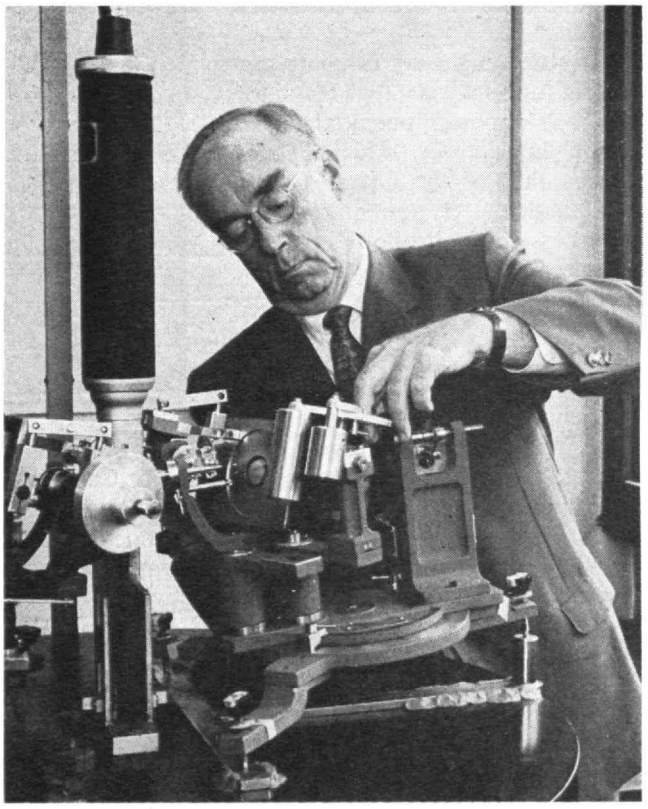
"If in the old days there was waste and lack of co-ordination for want of technically trained supervisory personnel, now there is waste and lack of co-ordination because of the very profusion of such personnel. . . . The faults of the new style of administration arise from motives that are respectable, often even admirable, and therefore they are not usually regarded as faults at all."

The effects of city politics on both society and on individuals, are liable to be indirect and uncontrollable. "Conceivably, for example, changes in the style of city politics, by affecting the national party system and thus the presidency, may affect the peace of the world and the future of mankind . . . Among these indirect effects there may be some that are more dangerous to the well-being of the society than any of the ills that municipal reformers have ever contemplated . . ."

Automated Crystallography

FOR MANY YEARS, Institute Professor Martin J. Buerger, '24, and his associates at M.I.T. have been inventing and improving means of using x-ray diffraction to study the structure of crystals.

The Weissenberg camera developed in Professor Buerger's laboratory in 1936 was the first practical, simple instrument for directing an x-ray beam through a crystal and photographing the resultant diffraction. It is still used in all laboratories. The precession camera developed somewhat later, however, made it easier to interpret the photos. Whereas the earlier camera yielded photos of diffraction spots in a curvilinear pattern which required a transformation to be interpreted, the precession camera produced pictures in which no transformation was necessary.



Institute Professor Buerger working with precession camera.

Another type of instrument developed in this M.I.T. laboratory is the x-ray single crystal diffractometer. In it a detector counts the pulses produced by diffraction when an x-ray beam is passed through a crystal. The work and time involved in using this instrument has now been reduced, too. In a new automated x-ray single crystal diffractometer, the crystal is positioned in relation to the x-ray beam, and is revolved while the pulses are counted and the information is stored in a data-processing unit.

Mrs. Hilda Cid-Dresdner, G, explored the crystal structure of turquoise for her doctoral dissertation recently with this new automated instrument. Although the arrangements of atoms in the crystals of most minerals have been analyzed now, much work remains to be done with such an instrument, in solid state physics, in metallurgy, and even in biology.

(The Trend of Affairs is concluded on page 32)

Evaluating Food's Wholesomeness

M.I.T. toxicology researchers are seeking ways to test foods quickly, conveniently, completely

BY LEO FRIEDMAN

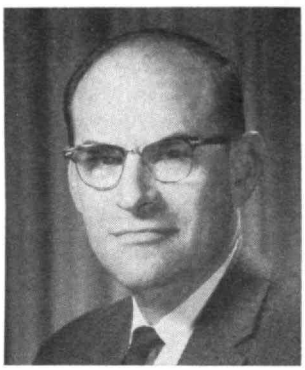
THE PROBLEM of determining the wholesomeness of food is obviously as old as man, and toxicology is probably one of the oldest areas of human knowledge. Today, no one, king or lord or anyone else, feels the need to have a taster on hand at every meal to test the wholesomeness of every dish served. Mortality and illness due to food poisoning are relatively rare occurrences in most parts of the world.* However, in the light of our present knowledge of physiology and nutrition and our concern with metabolic and chronic diseases, the problem of evaluating the wholesomeness of a food or food product is not as simple as it was in the days of the king's taster.

The living organism has often been compared to an enormously complex machine in continuous operation, carrying within itself an elaborately equipped maintenance department which makes necessary repairs without stopping operation. It also has the ability to enlarge the plant when necessary and desirable and even to make complete working models of the original machine. The obvious requirements for keeping such an unusual machine in continuous operation are: (1) suitable fuel for energy; (2) suitable structural raw materials for maintenance, repair, expansion, or growth; and (3) "operational" materials necessary to maintain proper function, which must be supplied to the maintenance department preformed.

Nutrition and Food Science

The science of nutrition has been concerned primarily with developing knowledge of the essential nutrients, their nature, their function, and their requirement by men and animals. However, nutrition is much more than the science of the nutrients; it is the science of the metabolism of *food* and *all* the substances therein. It must be concerned with their action, interaction, and balance in relation to health and disease, and with all the processes involved in their metabolism. Nutrition is concerned with wholesomeness of food, both from the standpoint of nutritional adequacy for keeping our machine in continuous operation and from the viewpoint of minimizing the effects of those nonnutrient components of food that would tend to gum up the delicate, complex machinery. Food science is concerned with developing knowledge about the chemical, physical, and microbiological reactions and interactions that is needed to make possible technological developments in agricultural production, preservation, processing, packaging, storage, distribution, and serving of food.

The interests of the nutrition scientist, who is concerned with the metabolism of food and food substances, and of the food scientist, who is concerned with the chemistry, physics, and microbiology of food as it passes from farm to dining room table, converge on the question of wholesomeness.



DR. FRIEDMAN is associate professor of nutrition and food safety at M.I.T. His article is a condensation of one of eight papers by members of the Institute's Faculty in Exploration in Future Food Processing Techniques, *edited by Samuel A. Goldblith, '40, and published last year by The M.I.T. Press.*

Techniques for Evaluation

The responsibility for decisions with respect to the safety of new substances in foods, new processes, and new products is borne by the scientists of the Food and Drug Administration. During the last 30 years they have established procedures for the appraisal of safety of substances in foods, drugs, and cosmetics. Data obtained by these familiar methods may be interpreted with some degree of confidence and are essential for reaching decisions concerning the safe use of new products. Although everyone, especially the FDA scientist, agrees that these methods are by no means the last word, that better methods capable of yielding more complete and more accurate information more rapidly are needed and should be developed, progress in this direction has been slow. The pressure to reach decisions immediately forces continued use and reliance upon the established procedures.

Evaluation of the safety of a new food product requires, ideally, complete knowledge of the metabolism of all the components and of the physiological effects produced by each, alone and in combination, especially at the levels expected in the ordinary diet. This demands the availability of techniques that will reveal low-level and subtle effects that may be produced by active substances at low concentrations or by relatively inert materials at higher dietary levels. The develop-

*This does not mean that we should be at all complacent about the large number of gastrointestinal disturbances that occur annually because of enterotoxins or otherwise spoiled foods. However, this problem is well understood and, for the most part, can be dealt with effectively on the basis of present knowledge.

ment of such techniques is an important and challenging scientific problem. A well-rounded and integrated research program is needed that will effectively probe the frontiers of knowledge in all the biological sciences and related disciplines toward this end.

The goals of such a program would include the development of a body of knowledge about the *physiological effects of food substances* in the various forms they may take in the different circumstances under which they are consumed, including those substances that are known, those that are partly characterized, and those that are only suspected or still unknown. Such a body of knowledge is needed, and it is being developed. It will grow at an exponential rate, and some day will have an appropriate name. At the present time we have settled on the term "food toxicology." No one is altogether happy with this name. However, until a better suggestion is forthcoming, "food toxicology" will refer to that scientific discipline concerned with the development of knowledge and understanding of the physiological effects, particularly the subtle effects, of food components that are necessary for proper evaluation of food safety. It must be emphasized that a physiological effect is not necessarily an indication of toxicity.

Food Toxicology at M.I.T.

The research program in food toxicology at M.I.T. is based on the fundamental assumption that every substance is capable of producing a biologic response. The problem we set ourselves is the development of (1) techniques for observing and measuring these effects and (2) a background of knowledge and experience upon which to interpret these observations.

Our work will be based firmly upon present techniques. Histopathology, which in many respects is still the most sensitive indicator of biologic effects, will serve as the base line for all our studies. We are unusually fortunate to have as an essential part of our team Dr. Paul M. Newberne, who is and has been for some time actively engaged in studies of animal nutritional pathology and the relation of nutrition to carcinogenesis. It is our plan to extend the scope of the morphological studies by development and application of electron-microscope and histochemical techniques whenever this promises to be fruitful, particularly in studies of carcinogenesis. We plan also to extend the development and application of other techniques which are at present often used in safety evaluation studies—for example, studies of the metabolic fate of test substances by means of isotopically tagged molecules; tests of physiological function in the whole animal; and the chemical composition of organs and tissues, including studies of specific enzyme activities.

Gas chromatography is one of many analytical techniques now used in the study of foods at the Institute.

The last few years have witnessed truly fabulous developments in biochemistry and physiology at the most fundamental levels. We should like to eliminate, or at least to shorten, the lag between the development of new knowledge and its application to the problems of understanding the physiological effects of food substances and food processes. I believe it possible and likely that workers with an orientation toward the essentially applied goal of safety evaluation will make significant contributions to our understanding of basic biological phenomena. We should like to have techniques to study, in animals that have been conditioned by a dietary treatment:

1) The functioning of the metabolic machinery—for example, the generation and utilization of energy, the synthesis of various important metabolites or body components, the turnover rate in various compartments.

2) The functioning of membranes, including intracellular membranes and the endoplasmic reticulum.

3) The functioning of biochemical regulating mechanisms.

Studies along this line will be undertaken with model compounds about which a great deal of knowledge is already available. Since our hope is to observe effects that are beyond the range of our present methods, these studies will be of particular significance for the carcinogenesis problem. We plan to include more than one representative of the several classes of known carcinogens. In all our work we shall include studies both in the whole animal and *in vitro* systems.

From one point of view, the scientific problem may be considered as essentially a problem in bioassay, which is primarily to obtain a living system that is sensitive and will respond consistently and specifically to a given treatment. Toward this end we shall explore the use of different species, strains within species, sex, age, etc., so as to obtain the most susceptible and the most sensitive animal for a specific response. Furthermore, we plan to continue studies of the effect of diet and nutritional status on sensitivity or resistance to specific challenges. For example, newborn or very young rats and mice have been reported to have particular sensitivity in certain carcinogenesis studies. Sanford A. Miller of our Department has been studying the nutrition of the preweanling infant rat. We plan to apply his experience with this interesting animal in studies of carcinogenesis.

Much of the current knowledge and understanding of biochemical and physiological processes has been derived from the study of microorganisms. As a result of

intensive work, particularly in virology, there is now available considerable experience in the maintenance of human and mammalian cell lines in tissue culture. If, as some preliminary evidence indicates, human cell cultures reflect the relative susceptibility to toxic agents of man as compared to experimental animals, we may have potentially a most useful tool to bridge the gap between observations in experimental animals and their application to human beings. *In vitro* cell culture makes possible the study of biological effects by established biochemical techniques in relatively simple systems. We expect that the study of the effects of substances on cell growth, cell morphology, and cell function will provide leads to promising areas for study in intact animals, and conversely indications from animal studies may be followed up more intensively in the simpler system. The use of human cell lines should have some advantage as a supplement to animal experiments in extrapolating with greater confidence than is now possible experimental animal findings to the human situation.

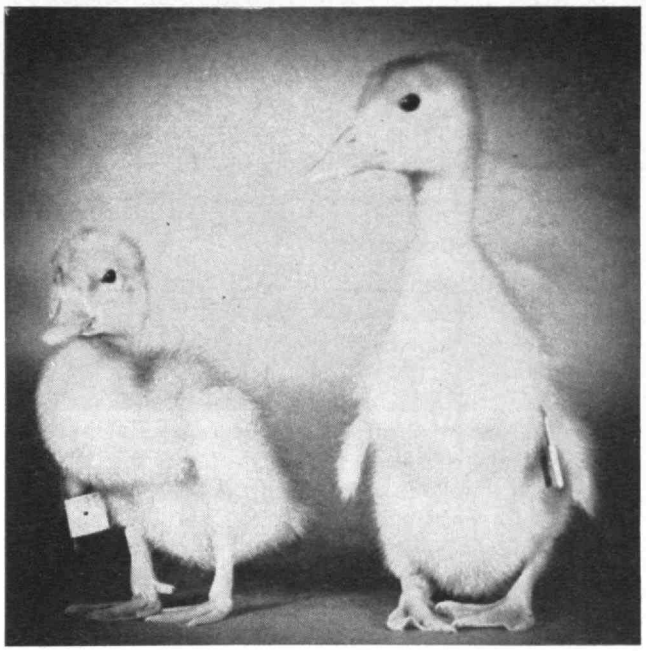
Investigations of this kind, as well as studies with other microorganisms, fertile hens' eggs, etc., as possible test systems, are an integral part of our "food toxicology" program. The laboratory is in the process of being organized and equipped, and studies have been initiated by Janis Z. Gabliks of our staff.

Current Problems

Besides investigations of new approaches using typical model compounds, we intend to maintain a concurrent program of study of several problems of current interest, using conventional methods, and dovetailing the new techniques when studies have progressed to the point where use of a new approach would be mutually profitable to both investigations.

One problem of continuing interest concerns the hydropericardium factor, or the so-called "chick edema" factor. A federal regulation requires that fatty acids used in foods be demonstrated by a specified test to be free of this factor. There is still no answer as to the source of this contamination. Until this question is answered, this factor represents a potential threat to the safety of the food supply that should not be forgotten. It has only been found as a minute contaminant, even in the most toxic samples that have been examined. However, its potential hazard derives from its extremely high order of toxicity, not only to the chick, but to rats, mice, guinea pigs, dogs, and monkeys. Most of the observations have been made with crude materials, except in the case of chicks and monkeys. Since this material is so hard to obtain in relatively pure form, very little study has been done thus far.

Another problem that is attracting a great deal of interest centers around the renewed awareness of the potential hazard of the molds to the food supply of man and animals. My colleague and close associate in the food toxicology program, Gerald N. Wogan, has led the studies at M.I.T. on the production of toxic metabolites by the mold *Aspergillus flavus* Link ex Fries, and their isolation and characterization, which have very recently resulted in elucidation of the chemical structure of aflatoxins B and G, the two most abundant components of the crude toxic extract of food inoculated with this mold. As efforts by Professor George H. Büchi of the Department of Chemistry to synthesize the aflatoxins continue, we are anticipating studies with isotopically tagged toxins, etc. From such interests, sooner or later a study will develop on the mycology in one or more food industries that will reveal whether and to what extent a mold-related hazard to food safety exists.



Eight-day-old duckling at left shows adverse effect of a fungal toxin being studied. Other bird was a control.

Another area of interest to us is that of the fats in our foods, the changes that take place before they get to the dining table, and how these changes influence the wholesomeness of the foods we eat. Specifically, I should mention the fatty acids that do not form urea adducts. These substances are always present in our food, but we should know more accurately to what extent. There is sufficient evidence to indicate that there is no serious short-term hazard. In my opinion, we should have much more information to evaluate properly the long-term hazard, if any. A question of so much public health significance should not go unanswered. It deserves as much attention, at least, as is given to the clearance of any food additive.

Problems in Evaluation

When we evaluate a new food product, a new food process, or the effect of storage conditions or handling on the wholesomeness of a food, we have a somewhat different problem from the evaluation of a pure compound, or a relatively homogeneous stable material that can be tested at many times the level that will be used in food. The microbiological and sanitation problems that produce acute effects are fairly well understood. It is more difficult to deal with the problem of small amounts of chemical components producing more subtle effects, which over a longer time may be equally serious. In evaluating the effect of a process such as freeze dehydration, high-temperature short-time sterilization, sterilization by foaming or the use of microbial filters, or chemical preservation by fumigants, antioxidants, antimycotics, antibiotics, etc., or by radiation

(Continued on page 36)

New Books

Mainly for Specialists

RECENT publications likely to be of especial interest to many M.I.T. Alumni have included:

Advanced Computer Programming: A Case Study of a Classroom Assembly Program, by Fernando J. Corbató, '56, Associate Director of the Computation Center and Associate Professor of Electrical Engineering; John W. Poduska, '59, Assistant Professor of Electrical Engineering; and Jerome H. Saltzer, '61, instructor in Electrical Engineering at M.I.T. (M.I.T. Press, $5).

Applications of Group Theory in Chemistry, by F. Albert Cotton, Professor of Chemistry at M.I.T. (John Wiley & Sons, Inc., $12.50).

The Compatible Time-Sharing System—A Programmer's Guide, by Fernando J. Corbató, '56, and Robert C. Daley of the M.I.T. Computation Center, and others (M.I.T. Press, $3).

A Course in Process Design, by Thomas K. Sherwood, '24, Professor of Chemical Engineering at M.I.T. (M.I.T. Press, $6).

Essays on the Structure of Social Science Models, by Albert K. Ando, Franklin M. Fisher, Associate Professors of Economics at M.I.T., and Herbert A. Simon (M.I.T. Press, $5).

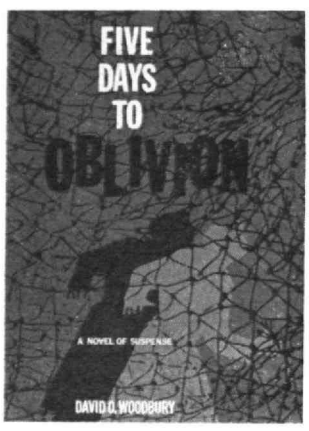
Five Days to Oblivion, a novel, by David O. Woodbury, '21 (Devin-Adair, $3.95).

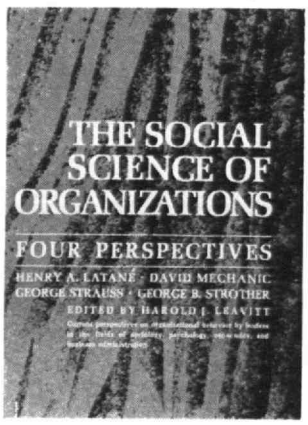
Individualism and Big Business, by Leonard R. Sayles, '50, Professor of Business Administration, Graduate School of Business, Columbia University (McGraw-Hill Book Company, Inc., $6.95).

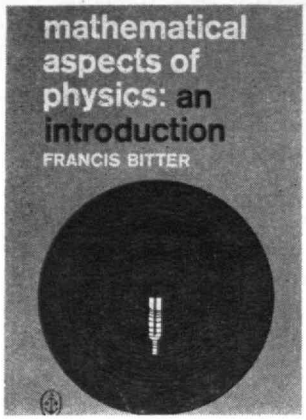
Introduction to Wave Mechanics, by Louis Harris, '20, Associate Professor of Physical Chemistry, and Arthur L. Loeb, Associate Professor of Electrical Engineering at M.I.T. (McGraw-Hill Book Company, $8.95).

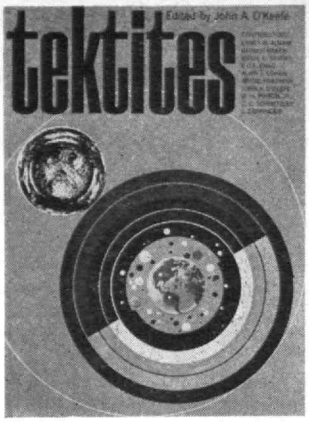
Lighting in Architectural Design, by Derek R. H. Phillips, '54, an associate of the Royal Institute of British Architects (McGraw-Hill Book Company, Inc., $17.50).

Low-Density Parity Check Codes, by Robert G. Gallager, '57, Assistant Professor of Electrical Engineering at M.I.T. (M.I.T. Press, $4).









Magnetic Resonance at High Pressure, by George B. Benedek, Associate Professor of Physics at M.I.T. (John Wiley & Sons, Inc., $4.75).

Mathematical Aspects of Physics: An Introduction, by Professor Francis Bitter of M.I.T. (a Science Study Series paperback, Doubleday Anchor, $1.25).

Mathematical Models in Physical Sciences, proceedings of a 1962 conference at the University of Notre Dame, edited by Stefan Drobot, with a contribution by Norman J. Zabusky, '53 (Prentice-Hall, Inc., $3.75).

Problems in Industrial Dynamics, edited by William E. C. Jarmain, '61, with contributions by Willard R. Fey, '57, Luther F. McPherson, 3d, '60, Richard F. Miller, Jr., '61, Ole C. Nord, '62, David W. Packer, '59, Alexander L. Pugh, 3d, '53, Edward B. Roberts, '57, Carl V. Swanson, '60, and Frank H. Weymar, '58, staff members of the M.I.T. School of Industrial Management Industrial Dynamics Research Group (M.I.T. Press, $6).

The Role of Diffusion in Catalysis, by Charles N. Satterfield, '43, and Thomas K. Sherwood, '24, both Professors of Chemical Engineering at M.I.T. (Addison-Wesley Publishing Company, Inc., $4.75).

The Sea: Ideas and Observations on Progress in the Study of the Seas, Volume II, edited by M. N. Hill, Cambridge University; Columbus O'D. Iselin, Professor of Oceanography at M.I.T.; and E. D. Goldberg and W. H. Munk, University of California (John Wiley & Sons, Inc., $20).

The Social Science of Organizations: Four Perspectives, edited by Harold J. Leavitt, '49, Professor of Industrial Administration and Psychology at Carnegie Institute of Technology (Prentice-Hall, Inc., $3.35).

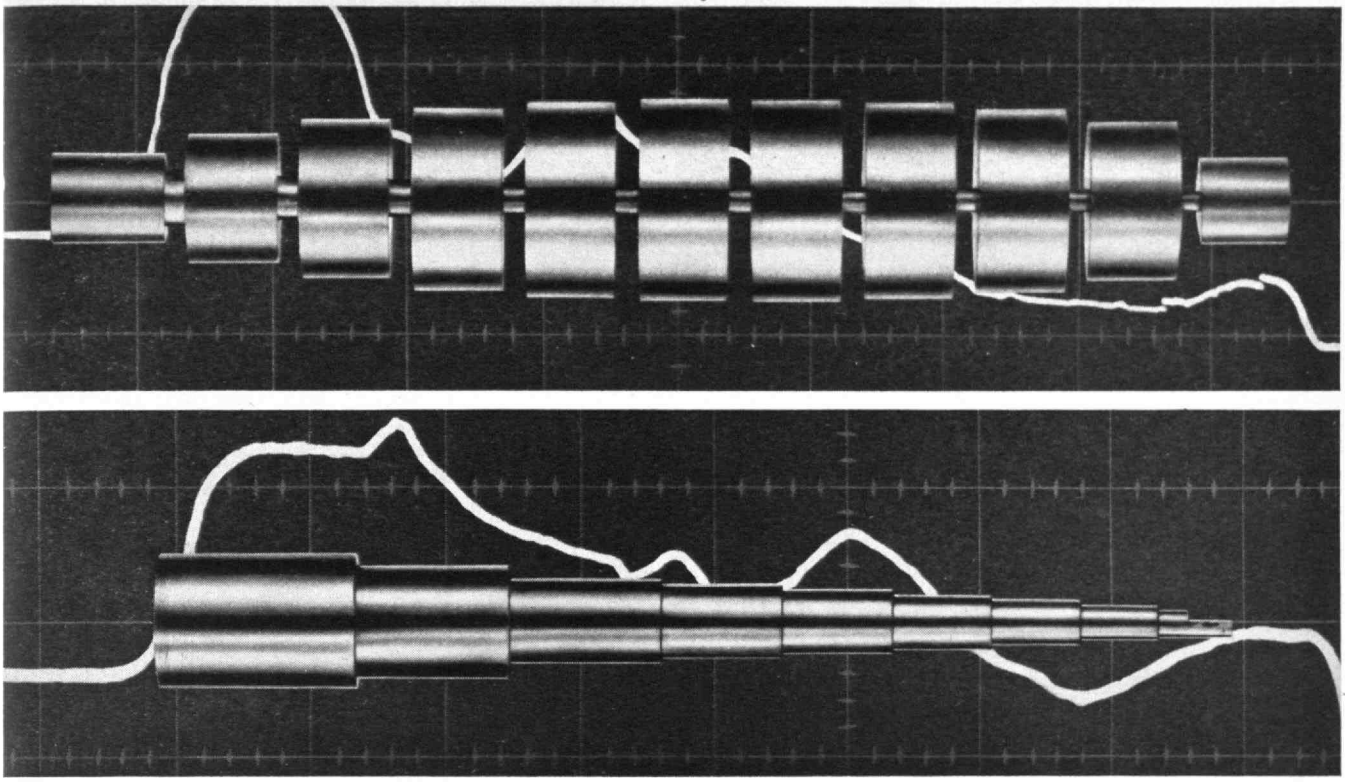
Switching Theory in Space Technology, edited by Howard Aiken and William F. Main, and including among its contributors William H. Kautz, '48 (Stanford University Press, $11.50).

Tektites, edited by John A. O'Keefe, with a report on their chemical composition by Charles C. Schnetzler, '62, and William H. Pinson, Jr., '52, of the M.I.T. Department of Geology and Geophysics (University of Chicago Press, $10.95).

The Theory of Turbulent Jets, by G. N. Abramovich; translated from Russian by Leon H. Schindel, '45, research associate in the M.I.T. Department of Aeronautics and Astronautics (M.I.T. Press, $20).

Threshold Decoding, by James L. Massey, '60, Assistant Professor of Electrical Engineering, University of Notre Dame (M.I.T. Press, $4).

(Book News is concluded on page 34)



These experimental cantilever configurations were designed to provide mechanical impedances for specified spectrums of resonances and antiresonances.

IBM® asks basic questions in mechanical design

How can undesirable vibrations be eliminated?

Increased drive speeds of mechanical and electromechanical devices for advanced data processing systems require more sophisticated methods of solving vibration problems to insure reliability. Consequently, IBM engineers have used improved analytic techniques to determine more precisely the wide-band frequency excitation occurring in various elements of a mechanical system. Since the operation of these devices is often intermittent, undesirable transient vibrations are produced during dynamic loading and upon impact. Dynamic transient analysis of these vibrations may be made using data obtained in the laboratory.

In both torsional and longitudinal analysis, strain gauges are used to obtain data during impact. Using Fourier transform methods to change from the time to the frequency domain, it is possible to calculate, over a wide frequency spectrum, the points at which undesirable vibration occurs and the levels at which it becomes serious enough to cause misalignment of parts, wear, and even malfunction or failure. These results may be used to determine the damping and energy dissipation.

A further use of such analysis is the derivation, at the laboratory stage, of possible configurations for parts and assemblies which improve the design and performance of mechanical devices. The complex calculations involved can be processed by large-scale computers such as the IBM 7090. For example, mechanical impedance concepts were used to design several experimental cantilever configurations. The models were constructed to have a predetermined spectrum of resonances and antiresonances. In practical applications, this technique might be used to detune torsional devices or eliminate rebound from clutch stops. Mathematical synthesis such as this could avoid the costs and delays of empirical trial-and-error methods in product development.

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Individuals Noteworthy

(*Continued from page 6*)

50 Years Celebrated

MARKING Frederick E. Broderick's 50 years of service to M.I.T., friends, fellow employees, and members of the Administration attended a reception given for him by the Institute on November 13 at Kresge Auditorium. President Julius A. Stratton, '23, spoke of Mr. Broderick's loyalty to M.I.T., citing his own student days when he obtained electrical equipment from Fred, and Vice-president Philip A. Stoddard, '40, presented a watch to Mr. Broderick.

Starting as an instrument clerk, Mr. Broderick has been employed continuously in the Department of Electrical Engineering with the exception of a year in the U.S. Marine Corps, and is now a project technician. His sister, the late Miss Etta Broderick, worked at the Institute from 1907 until 1947, and his brother James has been with the Office of Physical Plant since 1919.

The Department of Electrical Engineering also honored Mr. Broderick at a gathering on November 8 at the Faculty Club, at which he was given a photo album depicting his early years at the Old Rogers Building on Boylston Street, Boston.

Engineering Lectures

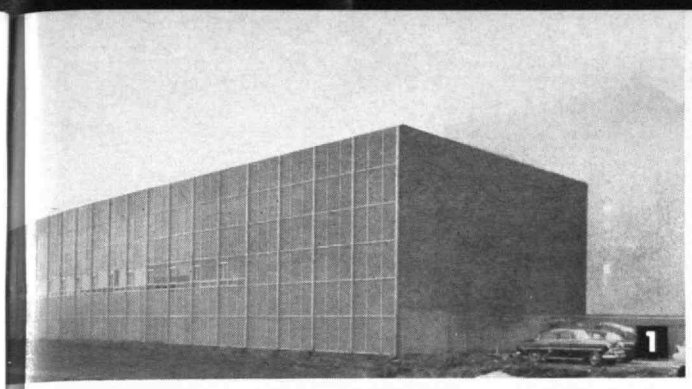
TEN of 13 lectures on Fundamental Hydraulic Processes in Water Resources Engineering, sponsored by the Boston Society of Civil Engineers this winter and attended by more than 120 engineers, were given by members of the M.I.T. Department of Civil Engineering. They were Professors *Arthur T. Ippen, James W. Daily,* and *Donald R. F. Harleman, '47;* Associate Professor *Peter S. Eagleson, '56;* and Assistant Professors *John F. Kennedy* and *Ronald T. McLaughlin.*

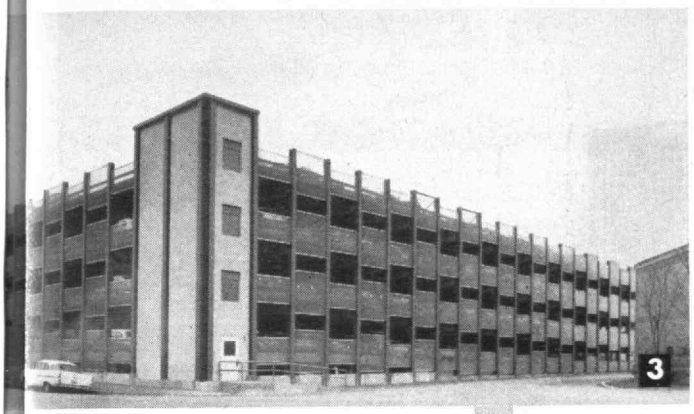
Liaison Director

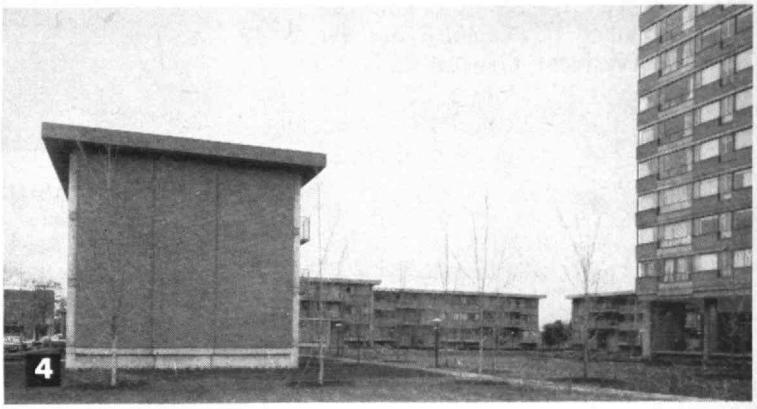
RICHARD B. FINN, JR., '54, who has been with the M.I.T. Industrial Liaison Office since 1960, is now its director. He studied at the Oak Ridge School of Reactor Technology after being graduated from M.I.T., and represented the American Electric Power Service Corporation in work pertinent to the development of power reactors for the utility industry.

(*Concluded on page 30*)

FRANKI FACTS







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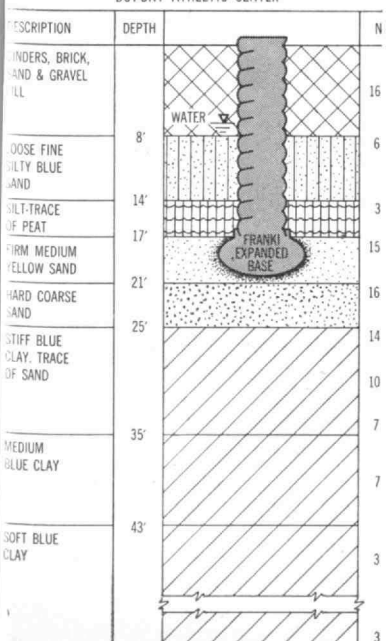
TYPICAL SOIL PROFILE
DUPONT ATHLETIC CENTER



Franki Foundations at M.I.T.

Problem

One of the major problems encountered by Massachusetts Institute of Technology as it expands its facilities to meet the increasing demands of the Space Age, is the selection of safe and economical foundations. The campus is underlain, typically, by about 20 feet of fill and peaty silt, a crust of sand and gravel of varying thickness, and the deep deposit of soft blue clay common to much of the Boston area.

At the David Flett du Pont Athletic Center (No. 1) it was decided to support the building on the crust. Since the sand layer varied from 8 to 12 feet in thickness, piles were subject to the objection that they might "punch through" to the clay, and an excavated caisson foundation would have to bear the heavy and indeterminate cost of large-scale dewatering.

Solution

The Engineers decided to investigate the Franki system of displacement caissons or pressure-injected footings, because of Franki's unique ability to forge a footing with 140,000 ft.–lb. blows at a predetermined depth in the top of the sand layer, creating both an expanded base and a large zone of densified sand, thus improving the natural "mat" action of the crust. They found that Franki was prepared to guarantee satisfactory installation of the caissons at a fixed lump sum price, eliminating contingencies for extra length or dewatering.

The Engineers' final design involved 215 Franki caissons, in groups of 2 to 6 units, carrying individual loads of 65 to 80 tons. The controlling factor was of course the stress applied to the clay, and the number and spacing of the caissons at each column was so arranged as to keep that stress relatively constant, and within the limit of 1 ton per sq. ft. generally accepted for soft Boston Blue Clay.

A load test to double design load in the most critical area, where the sand stratum was only 8 feet thick, (net settlement 0.24") proved the safety of the design.

Results

The du Pont Athletic Center has now been in service for four years, and the design assumptions have been fully confirmed.

In the meantime the Institute and its various professional consultants, listed at left, have specified Franki guaranteed lump-sum-price foundations on the Burton-Conner Dining Hall (No. 2), the large Parking Facility at Main & Vassar Streets (No. 3), and on the four low-rise buildings of the Married Students Quarters complex (No. 4), now being dedicated. Unit loads on these structures ranged up to 120 tons per caisson.

Franki is proud to have been able to contribute to the growth of this dynamic educational institution.

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Literature — This series of job highlights, as well as other descriptive literature, will be sent to you upon request to Franki Foundation Company, 103 Park Ave., New York 17, New York.

New Posts

NAMED in news of promotions, elections, and appointments have been:

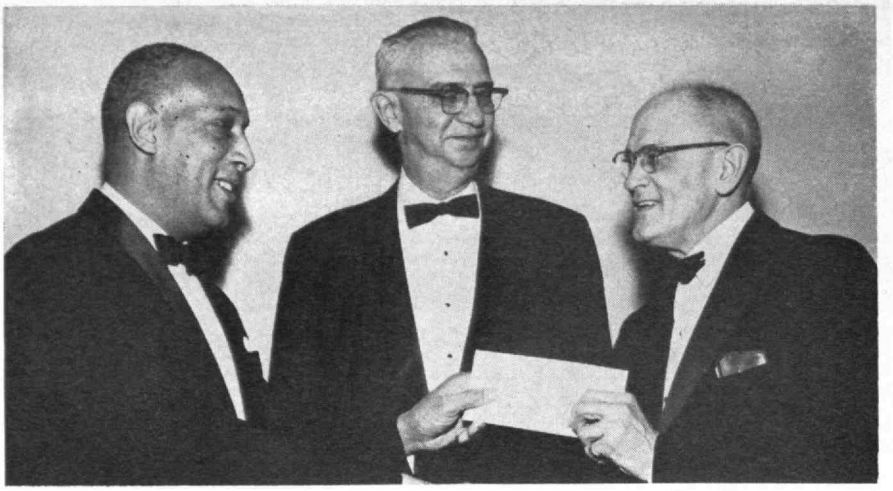
William J. Barrett, '16, as President, the American Craftsmen's Council . . . *John W. Beretta, '23,* as President-elect, National Council of State Boards of Engineering Examiners . . . *Donald B. Sinclair, '31,* as President, General Radio Co.;

Lewis W. Moore, '33, as a Trustee, Illinois Institute of Technology . . . *Dr. R. Vincent Kron, '37,* as Medical Director, IIT Research Institute . . . *Norman C. Michels, '41,* as President, Association of Iron and Steel Engineers;

William F. Orr, '41, as Marketing Research Manager, Film Operations, Olin Mathieson Chemical Corporation . . . *Jacob Kline, '42,* as Professor of Electrical Engineering, Iowa State University . . . *William M. Pease, '42,* and *Franklin B. Bossler, '45,* respectively, as Director of Special Projects, and as Director of Spacecraft Systems, Space and Information Systems Division, Raytheon Company;

Ray C. Frodey, '44, as Director, New Products, Gerber Products Company . . . *Allan L. Bralove, '46,* as Executive Vice-president, Documentation Incorporated, Bethesda . . . *Kenneth N. Davis, Jr., '46,* as Treasurer, International Business Machines Corporation;

Harold M. Brodsky, '47, as General Factory Manager, The Fafnir Bearing Company . . . *Hebert S. Kindler, '48,* as Director of Society Operations, The Instrument Society of America . . . *Colonel Charles D. Y. Ostrom, Jr., '48,* as Commanding Officer, both the Army Ballistic Research Laboratories and the Army Coating and Chemical Laboratories, Aberdeen Proving Ground, Md.;



AVERY A. ASHDOWN, '24, associate professor emeritus at M.I.T. received the $1,000 James Flack Norris Award last fall at a testimonial dinner of the Northeastern Section of the American Chemical Society. Henry A. Hill, '42 (at left), made the presentation and Cyril J. Staud, '24 (center), one of Professor Ashdown's many former students present, gave the testimonial address.

P. Gene Smith, '48, as Director, Radiation Systems Laboratory, Durham, N.C. . . . *Peter H. Spitz, '48, Robert S. Davis, '55,* and *Joseph L. Russell, '55,* as Assistant Vice-presidents, Halcon International, Inc.;

Frank X. Gleason, Jr., '50, as Executive Vice-president, Vermilya-Brown Company . . . *Floyd L. Wideman, Jr., '50,* as Vice-president—New Products, Johnson & Johnson . . . *Peter P. Radkowski, '53,* and *Edwin A. Goldberg, '56,* respectively, as Senior Staff Engineer, Aeromechanics Sub-division, and as Director, Standardized Space Guidance Program, Systems Research and Planning Division, Aerospace Corporation;

William M. Murray, Jr., '55, as Supervisor, New Product Manufacture, The Carwin Company . . . *Donald R. Welsh, '55,* as Merchandising Coordinator—Renewal Sales, Electronic Tube Division, Sylvania Electric Products, Inc. . . . *Alan Kotliar, '57,* as President and Chief Executive Officer, Sola-Basic Products, Ltd., Toronto;

John H. Connor, '58, as Director of Research and Development, Bradley-Sun Division, American Can Company . . . *Kenneth S. Wood, '58,* as President, Indianapolis District, Indiana Society of Architects . . . *G. Richard Huguenin, '59,* as Assistant Professor of Astronomy, Harvard University;

Eugene R. Karrer, '59, as Executive Engineer, Product Test and Development Section, Ford Motor Company . . . *Ralph R. Rumer, Jr., '62,* as Associate Professor, State University of New York.

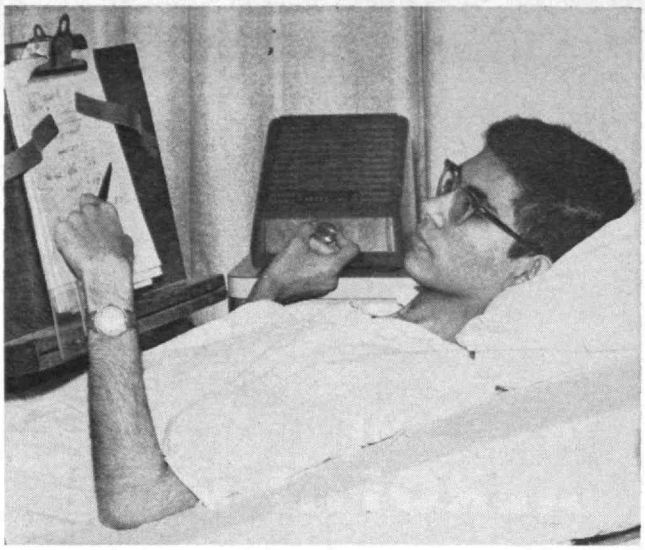
Corporate Enterprise

MANAGEMENT strategy for corporate growth in New England was the theme of a special conference held last November 12 at M.I.T. for the region's business leaders. Dean Howard W. Johnson of the School of Industrial Management presided, spoke of technological, market and governmental trends affecting industry, and introduced members of the Faculty who reviewed current research and economic problems.

Professor Jay W. Forrester, '45, discussed the dynamics of corporate growth; Professor Donald G. Marquis reviewed efforts to evaluate expenditures on research and development; and Professor Edwin Kuh spoke of the impact of monetary policy on employment, prices, and growth. A reception and dinner followed these lectures, and Chairman James R. Killian, Jr., '26, spoke finally on mobilization of the region's resources.

M.I.T. to Acquire Hospital

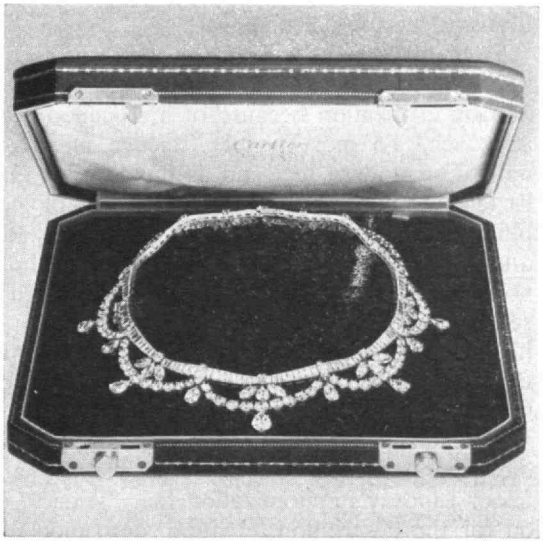
THE BOSTON ARCHDIOCESE which owns the 60-bed Sancta Maria Hospital on Memorial Drive between M.I.T.'s Baker House and the new women's dormitory has agreed to sell it to the Institute, and plans now to move its occupants to the Cambridge Sanatorium, which the Archdiocese has purchased from the city. Acquisition of the building will give the M.I.T. Infirmary additional space with which to meet the increasing demands for its medical services. M.I.T. also expects to acquire two nearby buildings now occupied by nuns.

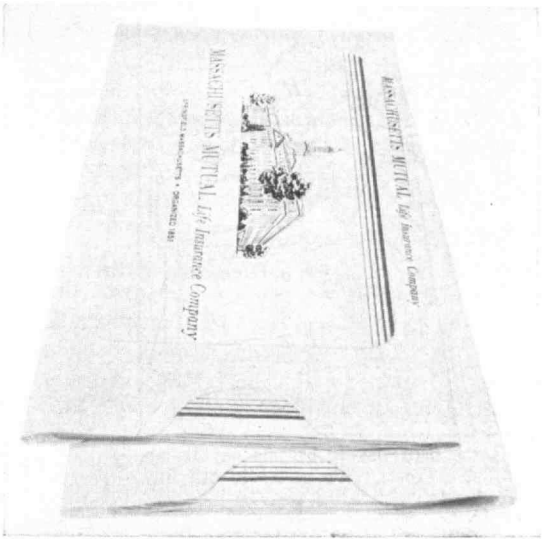


FARROKH CAPTAIN, '65, from Pakistan, continued his M.I.T. work, via a two-way communication system, from his hospital bed last fall while undergoing 14 operations necessitated by injuries in an auto accident.

Updating the Press

AGAIN last fall about 50 writers for the nation's mass media met in Boston for briefings on new horizons in science. Members of M.I.T.'s Faculty who addressed them included Dean Gordon S. Brown, '31, and Professors Edwin H. Land, Walter A. Rosenblith, Peter Elias, '44, and Arthur L. Samuel, '25.





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Cameron D. Warner, '61, Bethlehem

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New Books

(*Concluded from page 26*)

THE ROLE OF SCIENCE IN CIVILIZATION, by R. Bruce Lindsay, '24 *(Harper & Row, Inc., $6.50; text edition, $5.50).*

Reviewed by Clive H. Perry,
Assistant Professor of Physics at M.I.T.

THE AUTHOR of this illuminating and interesting book seems well qualified to analyze "The Role of Science in Civilization," having previously set forth numerous articles and papers on this and related subjects. His book would appear to be a useful contribution to the understanding of science in our contemporary civilization, its purpose in part being to alleviate the humanist's attitude towards the nature of science which Professor Lindsay feels to be erroneous.

Humanists are of the opinion that science will undermine the finer values of life and that its influence will destroy civilization because of a so-called materialistic approach. To most people, science means the technology of modern life, and as this is what the humanist tends to confuse with science, the ideological or the philosophical role of science is overlooked. Consequently, the first six chapters deal with the nontechnological approach and the not-so-obvious influence of science per se on our daily lives. The author transmits his thoughts and ideas in a concise and challenging manner, and clearly sets forth the issue before describing the role of science in civilization in detail.

"What is Science?" A few moments of thought by the general reader, and also the scientist, about Professor Lindsay's epitomization that "science is a method for the description, creation, and understanding of human experience" would probably help clarify some of the misconceptions. The creation of experience by experiment, the logical structure of a scientific theory, and the criteria of success as well as the use of imagination in scientific thought are dealt with individually to define the fundamentals of scientific purpose and method. The symbolism used in experiment and measurement and the concept of scientific theory and logic are well illustrated with examples, but one fears that the layman may balk at being so forcibly drawn into the technicalities of science.

The comparison between scientists and humanists and their relative attitudes of thought is fascinating and interesting. Humanists are said to be subjective in their approach to experience, while scientists are objective. The impact of science is universal whereas the impact of humanities is selective. In a large section devoted to the problem of the alleged difference between science and humanities on the subject of value judgments, many historical stories are cited to stress the fundamental similarity between the two. The relations between science and the humanities with respect to music, the graphic arts, and literature are well illustrated.

The relationship between Science and Philosophy and Science and History is dealt with in the succeeding chapters. The views of famous philosophers are given, and two questions are asked: "Has philosophy had an influence on the development of science and what role does it now play in present-day science?" And, "Do

scientific developments influence philosophical views and what impact does this make on society as a whole?" These questions are answered with many references to past and present philosophical and scientific ideas and their influence on each other. The problem of dogmatism in science and technology is considered, and the inherent dangers present when science is tied too closely to a dogmatic philosophy are discussed.

A complete chapter is devoted to Science and History. A whole book could well be written on this, but the influence of science throughout the ages is well brought out.

The chapter on Communication is long, somewhat involved and requires a certain basic scientific and mathematical background to be fully appreciated. Perhaps this book was written to explain the scientist's point of view primarily to the nonscientist, in which case it would appear that the layman would probably scan this chapter rather rapidly, and consequently fail to appreciate the role of science in communication, other than see that it looked highly complicated and mathematical. This is unfortunate, and possibly a simpler, shorter chapter would have been more effective for the average reader. For the scientifically inclined, however, the illustrations concerning connection between information theory and thermodynamics should be especially stimulating.

The history of technology and the role of technology in civilization are thought to be understood by everyone in terms of mechanical contrivances, military weapons, and other such materialistic objects. The author, however, brings out that what technology essentially has done is to increase the number of ways that energy can be transformed into work and to increase the availability of energy. Some sound arguments are presented concerning the obvious advantages of our technological advancement—and one is left to hope that a science of human behavior is beginning to take shape that will exhibit all the benefits embodied in the understanding of the science of human experience.

The freedom of science is a most fundamental problem and the present-day involvement of science and the state poses many unanswered questions. The dependence of the state on science and technology can be traced back through history, and the author causes one to wonder what the future of civilization will be when an increasing number of scientists are consulted by the government on various topics.

The final chapter deals with science and human behavior. Professor Lindsay feels that the scientific study of human behavior is extremely complex, and to illustrate his arguments he refers to various schools of thought on the subject. The ethical dilemma of science and the science of ethics are discussed. The latter is given a scientific analogy based on the principles of thermodynamics. A large number of references associated with the discussion, development and criticism of this theory are given for more extended reading. The bibliography, index, and numerous references throughout the book are excellent.

Let us hope that Professor Lindsay has succeeded in convincing the nonscientist that the role of science in civilization is in general beneficial, and will not reduce man to a machine, but in fact will achieve greater aesthetic values for the human race.

Evaluating Food's Wholesomeness

(Continued from page 25)

preservation, there is usually no indication as to where there may be a problem. How, then, shall the investigation of the effect of processing on wholesomeness be conducted?

The first aspect to be considered is the question of nutritive value. All of the nutrients may be measured. Where the absolute values may be in doubt, the relative values are useful to indicate whether a significant alteration in nutrient content has occurred. Biological tests for protein quality and growth studies to detect gross changes in over-all nutritive value are fairly well standardized, of relatively short duration, and not particularly difficult to interpret.

The other aspect of a wholesomeness study is to test whether chemical or other changes attributable to the process have resulted in the presence of new substances in the final product, and if so, whether they may be present in amounts hazardous to health.

The accepted procedures for determining the wholesomeness of a food are based on the feeding of the food, in the state in which it is usually consumed in the human dietary, to experimental laboratory animals during a major portion of their life span. The test food must be fed at a level that will make possible a nutritionally balanced diet. There is some question whether such a test, laborious, time-consuming, and expensive as it is, can always provide data upon which decisions may be based with confidence. With positive results, interpretations are relatively easy, but with negative data we are in the position of not being certain. However, the test is essentially a bioassay; since there is usually a dose-response relationship, it seems desirable to increase the dose in order to be in the range of the dose-response curve. This may be achieved by fractionation and concentration of the original material, well-established practices associated with the discovery, isolation, and characterization of most natural substances of biological significance.

Of course, such procedures may have many pitfalls; and until data obtained this way are correlated many times with the established test, they cannot be acceptable substitutes.

Another problem in the testing of many usual foods is their very high moisture content, which presents many difficulties in the preparation and storage of experimental rations and other practical problems of managing an animal experiment. Freeze dehydration has developed to the point where it may be considered as a tool to overcome this problem. Here again, before it can be acceptable as an alternative to the established procedures, this process must itself be thoroughly evaluated and proved not to introduce new factors or artifacts that will confound the interpretation of the results.

Here we have a dilemma. The suggested exploratory procedures cannot be required by the Food and Drug Administration scientists, since alone they will probably not supply acceptable data useful for reaching a decision on wholesomeness. Because the standard techniques are sanctioned by the FDA, no one can see spending the extra effort and money to do the "unnecessary" work. As in the past, the result is that there

(Concluded on page 39)

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Evaluating Food's Wholesomeness

(Concluded from page 36)

is little chance for a revision of the "bible" describing procedures for "Appraisal of the Safety of Chemicals in Foods, Drugs and Cosmetics" until the Food and Drug Administration scientists themselves investigate new approaches and techniques of safety evaluation.

In order to provide a more stringent test for the presence of biologically active substances in food, we plan short-term feeding trials in several species of small laboratory animals, e.g., rats, chicks, ducklings, quail, etc., of a series of extracts of the food, for example a hexane extract, a chloroform extract, an alcohol extract, an aqueous extract, etc. This type of study may uncover undesirable effects of a new food product much earlier than feeding the food as it is ordinarily consumed. With sufficient experience and correlation it may be possible to have a shorter more reliable test.

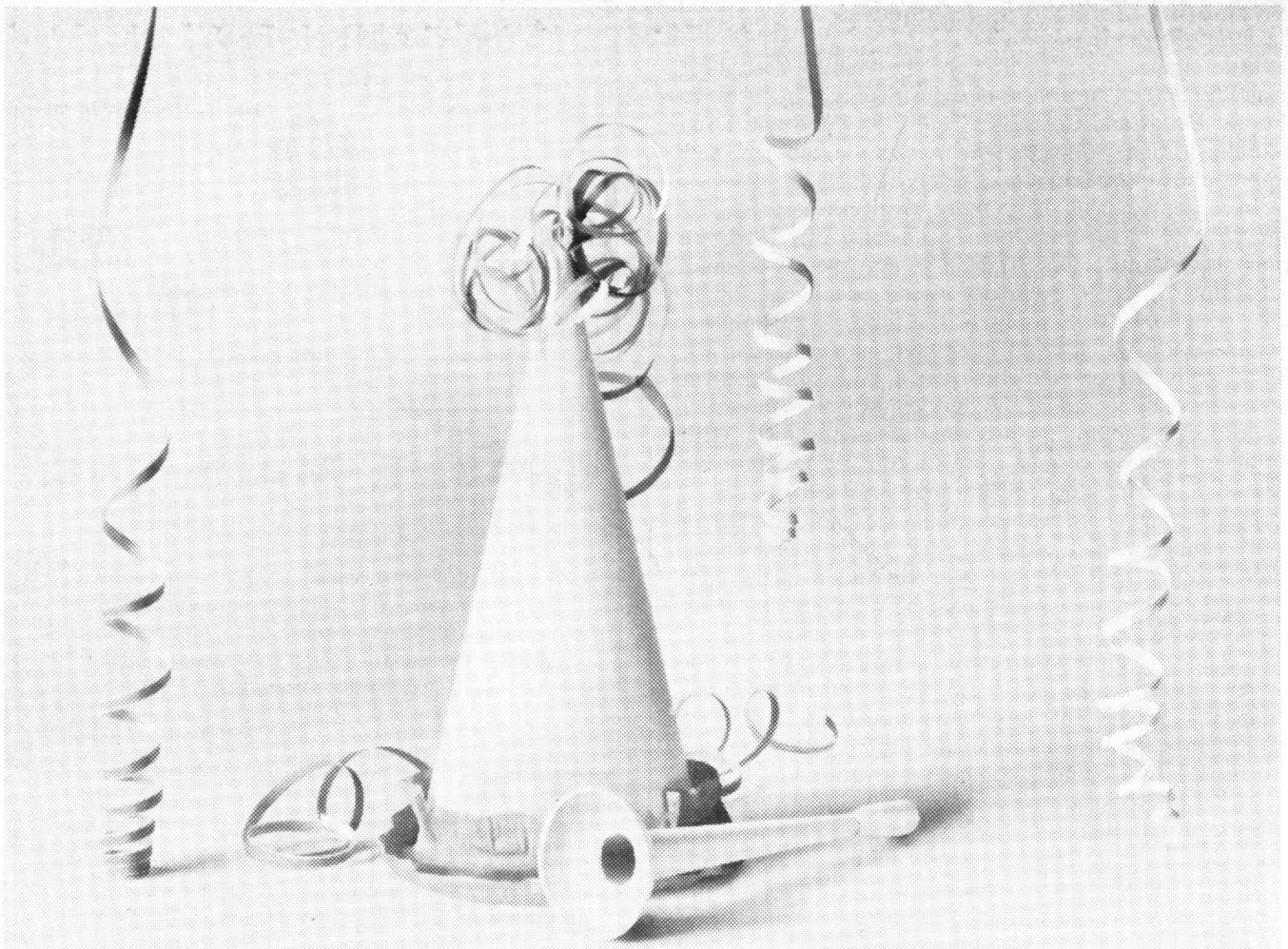
Development of methods that are more sensitive, more stringent, and more capable of detecting subtle effects should not be resisted as attempts to prove that everything is harmful, but should be welcomed as being capable of giving us the facts. For, with knowledge of the facts, the food industry will have a sound basis for utilizing its scientific skills and technological resources to produce foods that are more nutritious and more wholesome, foods that are better able to provide the nutritional environment conducive to optimum health.

I have often asked myself, "Is a program of the scope and magnitude indicated realistic?" My answer is, "Not only is it realistic; it is absolutely necessary if we are to have methods and parameters that will give us the answers we must have, more conveniently, more completely, more quickly, and more economically."

Working on the Weather

TREATMENT of the surfaces of various abundant inorganic substances such as silicas can make them efficient materials with which to seed clouds, Lehigh University researchers have reported. Professor Albert C. Zettlemoyer, '41, has directed the work. It has led to the invention of processes expected to be helpful in efforts to control atmospheric phenomena, and will be continued under a National Science Foundation grant.

"Man will make great strides toward control of the earth's weather within the next decade," Professor Zettlemoyer believes. "The production of highly efficient, economical nucleating agents, based on the new concept discovered in the Lehigh laboratories, can aid future attempts in beneficially changing weather."



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Club News

Detroit Club Topic Is Flight Control

Under the banner "Advancing Frontiers '64," the M.I.T. Club of Detroit launched its activities for the year with a dinner meeting on October 17 at Detroit's Metropolitan Airport. More than 100 Alumni and wives heard Carl Hayward, supervisor of the Federal Aviation Agency Air Traffic Control Center at the airport, describe the complexness of handling modern commercial aviation traffic. Tours of the ATC Centers of Metropolitan and Willow Run Airports gave members the opportunity to watch flight controllers and their equipment in action.

Topics for other meetings this club year include the emerging partnership of medicine, science, and engineering; new technology in mass media printing; and Detroit's new horizons in the arts. A member of the M.I.T. staff will speak at a meeting to acquaint local high school counselors and superintendents with the Institute.

Our club's directors have started a fund to provide aid to prospective students who cannot meet the expense of an M.I.T. education. The fund is designed to help worthy applicants who, even with the aid of an Institute scholarship, could not otherwise attend M.I.T. Initial contributions indicate enthusiastic support from area Alumni.

Club officers elected for 1963-1964 are: Ernest W. Upton, '43, President; Julian M. Greenbaum, '53, Vice-president, Program; Ella P. Gardner, '55, Vice-president, Membership; J. Edward Schwartz, '52, Secretary; C. Elbert Valentine, 3d, '57, Review Secretary; and Frank G. Rising, '59, Treasurer.—C. Elbert Valentine, 3d, '57, Review Secretary, 1061 North Woodward, Birmingham, Mich.

Long Island Alumni Tour Hi-Fi Company

The M.I.T. Alumni of Long Island plan to tour the Harmon Kardon Electronics Company (makers of hi-fi equipment) on December 6.

Club members held their annual beer party on October 11 at Rothmann's Inn in East Norwich. Fifty Alumni, wives, and sons heard E. Eugene Larrabee, Assistant Professor of Aeronautics and Astronautics, describe the replacement of the Douglas DC-3 by modern cars on modern highways. He predicted that longer range feeder-line airplanes will be replaced by ultra-modern cars and 100-mile-per-hour traffic on even better highways. He suggested that motorists should put their new automobile tires in the rear, because a blow-out in the front is less dangerous at high speed. Movies of auto racing were accompanied by a few comments by Mrs. Larrabee.—Douglas A. Tooley, '28, Secretary, 11 Cider Mill Lane, Huntington.

Future M.I.T. Club Meetings

Following are the dates and principal speakers as announced at the time of printing for M.I.T. Club meetings during January and February, 1964. For more details consult the club secretary in your city.

January 9—Boston—Professor Patrick D. Wall
Secretary: John M. Reed, '51, Room 831, 73 Tremont Street, Boston

January 13—Denver—Professor Irwin W. Sizer
Secretary: Benjamin A. Oxnard, '25, Great Western Sugar Company, Denver

January 14—M.I.T. Alumni Center of New York—Professor Lincoln P. Bloomfield
Executive Secretary: James N. Phinney, United Engineering Center, 345 East 47th Street, New York

January 14—Detroit—New Technology in Mass Media Printing
Secretary: J. Edward Schwartz, '52, 1912 Yosemite, Birmingham

January 21—Philadelphia—President Julius A. Stratton, '23
Secretary: John B. Murdock, '41, Perlite Corporation, Landsdown

January 28—Washington, D.C.—Program to be Announced.
Secretary: Richard R. Martin, '45, Decision Systems, Inc., Kennsington, Md.

February 13—Boston—Metropolitan District Commission—Plans, Problems, Politics

Additions to this column of meeting announcements are welcome. Copy is due January 20 for the March issue of The Technology Review and should list your club meetings for March and April. Send your copy to: Alumni Secretary, M.I.T. Alumni Association, Room 1-280, Cambridge 39, Mass.

Atlanta Club Members Host to M.I.T. Visitors

The M.I.T. Club of Atlanta held a dinner meeting on November 11 at the Cherokee Town Club. The meeting coincided with the visit to Atlanta of D. Hugh Darden, Director of the Educational Council, and William H. Dennen, '42, Associate Professor of Geology. Before dinner, Mr. Darden, Dr. Dennen, and local members of the Educational Council met with about 20 counselors from high schools in the Atlanta area.

Clarence P. Moore, 3d, '48, Club President, presented the proposed club constitution and it was unanimously approved by the members. William T. Shuler, '38, Vice-president, then introduced Professor Dennen who discussed "The Origin of the Earth."

Other members who attended with their wives were: James C. Bailey, '52, Harold W. Beers, '06, Earle E. Blount, '28, Zach S. Cowan, '44, Joseph T. Davis, '61, Vincent C. Frisby, '33, Richard L. Gatewood, '25, Charles H. Hurkamp, '27, Edward D. Johnson, '56, L. B. Locklin, '28, Bernard H. Meyer, '42, Charles W. Mills, Jr., '35, Dimitrios A. Polychrone, '47, Merlyn E. Richardson, '34, Elmer E. Sanborn, '22, William F. Spreen, Jr., '34, James R. Stevenson, '50, and John P. Tillinghast, '31. Classes represented spanned more than a half century.

Those who had expected to attend the dinner but were unable to included: Mr. and Mrs. William E. Huger, '22, Mr. and Mrs. Fred N. Dickerman, '30, and Winston A. Cartledge, '55.—Bernard H. Meyer, '42, Secretary-Treasurer, Brookgreen Road, Atlanta 28, Ga.

Western Pennsylvanians Plan Spring Meeting

The M.I.T. Club of Western Pennsylvania will hold its second meeting of the year at the University Club in Oakland on March 2. Prof. Roland B. Greeley, M.I.T. Director of Admissions, will speak.

Ernest U. Buckman, 2d, '46, Club President, has announced the following 1963-1964 Board of Governors: Warren H. Howard, '44, Hugo C. Johnson, Jr., '46, James L. Taylor, Jr., '02, Spalding M. Toon, '40, terms expiring in 1964; James B. Allen, '36, Charles R. Holman, '36, terms expiring in 1965; Jerry McAfee, '40, Edward F. Murphy, Jr., '41, and Benjamin W. Steverman, '31, expiring 1966.

Further information about the club and its meetings may be obtained by calling Edward F. Murphy, Jr., of Pittsburgh, at 922-5700.—Eli I. Goodman, '50, Secretary, Westinghouse Electric Corporation, Astronuclear Laboratory, P.O. Box 10864, Pittsburgh 36, Pa.

Japan Association Entertains Professors

The M.I.T. Association of Japan entertained several members of the M.I.T. Department of Electrical Engineering and their wives at a party on September 16. In Japan to attend a meeting of the International Scientific Radio Union, the professors were: Alan H. Barrett, Amar G. Bose, '51, Lan J. Chu, '35, Arnold A. Shostak, and John M. Wozencraft, '51.

Twenty-nine club members also met on November 5 to honor Professor L. Bisplinghoff and R. Kikuchi of the Hughes Aircraft Company.—Yukio Hori, '57, Secretary, University of Tokyo, Japan.

Northern New Jersey Club Mourns James L. Vaughan, '36

The M.I.T. Club of Northern New Jersey opened the 1963-1964 year by reading a resolution "In Memoriam" honoring James L. Vaughan, '36, who passed away in June shortly after being elected club president. His death was a great loss to our M.I.T. community.

John T. Reid, '48, Club President, welcomed 60 members and guests to the first meeting held on September 24 at the Hotel Suburban, East Orange, N.J. Mr. Reid announced the club's participation in an experimental one-day Regional Guidance Conference to be held April 18. Sponsored jointly by the club and the Regional Educational Council, and in conjunction with M.I.T., its objective is to bring the high school guidance counselors and Alumni up to date on M.I.T.—its purpose, aims, and standards.

The speaker was Colonel Bernt Balchen—pilot, explorer, author, and artist. Colonel Balchen recounted some of his experiences as an organizer of the Norwegian underground movement. He told of Norway's strategic position in the naval war, of fighting from bases on friendly but foreign soil, and about the destruction of the German heavy water plant and stores. Colonel Balchen punctuated the talk with anecdotes.—Roman N. Chapelsky, '53, Secretary, 329 Rosehill Place, Elizabeth, N.J.

Rochester Club Elects Edwards to Presidency

The M.I.T. Club of Rochester held its annual meeting and steak roast at Mendon Ponds Park on September 21. As is customary, the "odd" and "even" graduating classes engaged in a spirited softball game. The "odds," led by a switch-hitting former club president, eeked out a narrow victory over an undermanned (and overweight) adversary!

Following the game and dinner, officers were elected: Evan A. Edwards, '37, President; Gordon L. Calderwood, '27, President-elect; James K. Littwitz, '42, Vice-president; Reynold A. Grammer, Jr., '47, Treasurer; Gail E. Millard, '58, Secretary; and Donald B. Steig, '55, Assistant Secretary.—Donald B. Steig, '55, Assistant Secretary, 2125 Monroe Avenue, Rochester 18, N.Y.

Connecticut Valley Alumni Consider New England Houses

Fifty Alumni and guests of the M.I.T. Club of the Connecticut Valley met on October 27 at the Log Cabin Restaurant, Holyoke, Mass., for a social hour and dinner.

John C. Parker, '27, spoke on famous haunted houses of New England and illustrated his talk with his own watercolor drawings and photographs.

Newly elected officers are: Joseph A. Nowak, Jr., '47, President; Charles S. Parker, '39, and Robert L. Tessier, '53, Vice-presidents; Lloyd Gilson, '55, Secretary; and F. Miles Sawyer, '48, Treasurer. —Lloyd Gilson, '55, Secretary, 132 Chalmers Street, Springfield, Mass.

New Mexico Club Celebrates Anniversary

The M.I.T. Club of New Mexico celebrated its 10th anniversary by holding a dinner meeting on October 21. The Director of the M.I.T. Educational Council, D. Hugh Darden, described the selection of the freshman class. Twenty-eight Alumni, wives, and guests attended. Earlier in the day, Dr. Darden met with local high school representatives at luncheon and discussed entrance requirements at M.I.T.

Alfred M. Perkins, '23, a board member of the club who sculpts, writes, and carves wood figures as a hobby, and goes by the southwestern title of Don Alfredo, has been carrying on a Pan-American back-fence chat with another member of the class of 1923, Sr. Don Jose Carlos Bertino of Buenos Aires. This international exchange, incidentally, was started by our Club News in the Tech Review last winter. The two Dons have uncovered a mutual interest in old military uniforms and in the creation of military figurines of bygone days. Don Jose recently attended the 40th reunion of his class at the Institute.

Other club members making news are: Brooke H. Anderson, '57, of Sandia Corporation, who has published an article entitled "Rigid Form Structure for Shock Protection of Electronic Sub-Assemblies," in the September issue of *Electro-Technology* magazine. Brooke is forsaking Sandia to become the AEC technical representative in Albuquerque for CPR International Division of Upjohn Company, Torrance, Calif. . . . William R. Perret, '30, one of the club founders, has become a globe trotter—traveling to Switzerland, Norway, Germany, and England last summer. His trip was sponsored by the Swiss Federal Office of Civil Defense, and while in Zurich he lectured on free-field ground motions produced by explosives. . . . F. C. (Ted) Alexander, '32, has returned from his annual expedition to the wilds of Wyoming, having reduced the antelope population of that state by one.

The club is planning a luncheon at the Palace Restaurant in Santa Fe on January 18. The program will include an illustrated lecture on the archeology of the Navajo Dam area (located in the northwestern corner of New Mexico) by Alfred Dittert, Director of the Museum of Anthropology at Sante Fe. All Alumni and friends are invited to contact this secretary for reservations.—Thomas J. Raftery, '31, Secretary, 1505 Valencia Drive, N.E., Albuquerque, N.M.

Hartford Club to Hear Professor Ascher Shapiro

The M.I.T. Club of Hartford held its first fall meeting on November 19 at the Statler Hilton Hotel in Hartford. Orrie M. Friedman, Professor of Chemistry at Brandeis University, explained the "Chemical Treatment of Cancer."

Ascher H. Shapiro, '38, Ford Professor of Engineering at M.I.T., will discuss "Educational Films in Fluid Mechanics" at the club's second meeting on January 22. —William A. Bayer, '58, Secretary, 281 Hackmatack Street, Manchester, Conn.

New Haven County Club Hears C. Stark Draper

More than 60 members of the New Haven County M.I.T. Club met at Les Shaw's, in New Haven on October 30 to hear C. Stark Draper, '26, Head of the Department of Aeronautics and Astronautics at M.I.T., discuss "Guidance for Spaceflight." Dr. Draper, one of the world's leading space scientists, is engaged in solving problems that range from guidance of manned spacecraft to the moon to guidance and control of a winged craft boosted to the near reaches of space by a 10-story rocket.

Dr. Draper feels confident that we will successfully get to the moon and that important space technology will be developed in the process. At the completion of his fascinating formal presentation, he answered questions from the floor. Questions pertaining to the inertial guidance capabilities of the USSR, possible timetables for our future space efforts, and the extent of M.I.T.'s Instrumentation Laboratory involvement in the actual contracting of guidance systems were discussed. We were especially interested in the questions asked by some of the wives —indicating interest and comprehension of Dr. Draper's presentation.

This meeting was our first for the 1963-1964 season and gave us an enthusiastic start. We expect to provide equally interesting programs throughout the year and hope that those members not able to attend this meeting will make an effort to schedule future club activities into their itineraries.—Jay R. Bonnar, '57, Secretary, Lower Grassy Hill Road, Woodbury, Conn.

Lower Ontario Club Plans Meeting with Harvard Club

The M.I.T. Club of Lower Ontario held its first fall meeting on October 15. Columbus O'D. Iselin, Professor of Oceanography, gave an interesting talk on his field. Dr. Iselin was introduced by the Honorable Robert H. Winters, '33, the President of the Alumni Association. Two other meetings are planned for this season—including one to be held in association with the Harvard Business School Club of Toronto at which Jay W. Forrester, '45, Professor of Industrial Management, will be the speaker.—Michael M. Koerner, '49, Secretary, 14 Ridgefield Road, Toronto, Ontario, Canada.

Delaware Valley Group Hears Professor Iselin

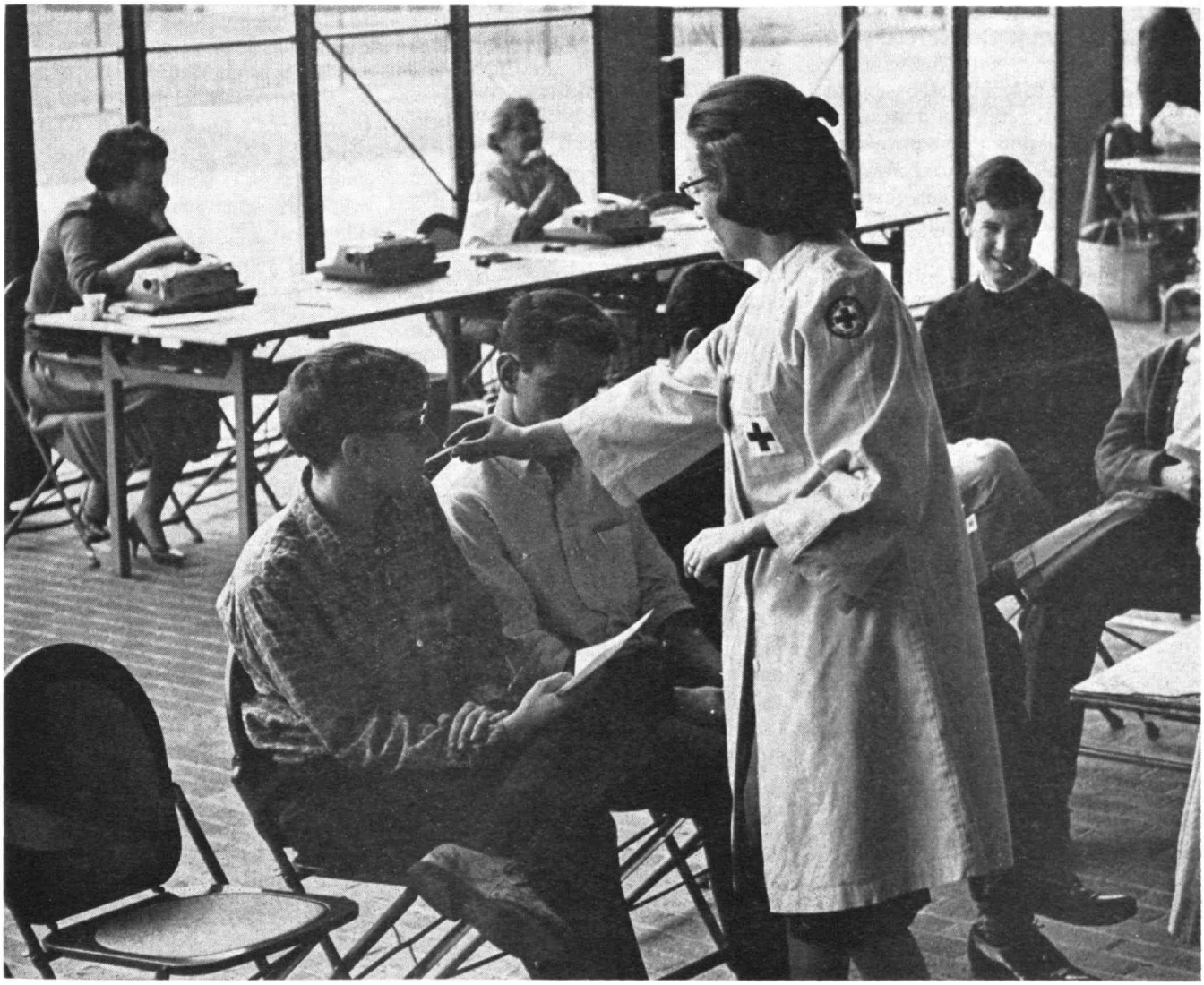
A hundred and forty-one members and guests of the M.I.T. Club of the Delaware Valley heard Columbus O'D. Iselin, Professor of Oceanography, at a dinner meeting on October 29. They met at the new Aquarama, Theatre of the Sea, in Philadelphia, where dinner was served at the side of an aquarium. Both before and after the meeting, guests viewed the many exhibits, and watched the whale being fed and the dolphins at play in a glass tank the size of a basketball court.—John B. Murdock, '41, Secretary, 15 Runnemede Avenue, Lansdowne, Pa.

Fraternity Men Give Blood for Hemophiliacs

MEMBERS of 28 fraternities at M.I.T. contributed a total of 210 pints of blood in November for the New England Hemophilia Association. "Chip" Lansing Hatfield, '64, from Burlingame, Calif., organized the blood drive, which was sponsored by the Interfraternity Conference. Blood collected from the fraternity volunteers represents a donation estimated to be worth from $6000 to $7000. Blood is given to a patient at a cost of about $35 per pint.

"Chip" Hatfield and his friends in Chi Phi became interested in blood for hemophiliacs while making a donation at Boston City Hospital for a friend. There they saw posters for the Hemophilia Association and decided that the organization could be helped by IFC. The drive was the first conducted for the Hemophilia Association by a student organization and is the largest drive ever undertaken in the Boston area for hemophiliacs. Blood for hemophiliacs—persons whose blood does not clot normally—must be specially processed; five Boston hospitals shared the processing work.

"Chip" Hatfield, '64, the drive's organizer, is shown above while (below) contributors line up for temperatures.



Institute Yesteryears

As recalled by the late H. E. Lobdell, '17

25 Years Ago

"IN AN INSTITUTION such as Technology, extremes and opposites are commonplaces," sagely observed The Review. "Physicists break the atom into bits; chemists meanwhile build up molecules into more and more complex patterns. Biologists nurse bacteria to lush growth in culture media, while biophysicists are slaughtering other bacteria by the billion in a stream of lethal radiation.

"It is therefore not surprising that while chemical engineers are laboring to speed up the rate at which heat is transferred from one body to another, heat engineers should be taxing their ingenuity to keep heat from being transferred.

"In this work the Institute's heat engineers are now better equipped than ever before, with the housing of their laboratory in the basement of the new Rogers Building. The new quarters not only have improved light and space, but also are far more efficient in mechanical conveniences and apparatus."

► On January 25, Professor Emeritus *Dugald C. Jackson,* Head of the Department of Electrical Engineering from 1907 until his retirement in 1935, was presented with the Edison Medal, by the American Institute of Electrical Engineers. Others honored included: *Louis S. Cates, '02,* the William Saunders Gold Medal, by the American Institute of Mining and Metallurgical Engineers; and *Erwin H. Schell, '12,* the Gilbreth Medal, by the Society for the Advancement of Management.

Dugald C. Jackson

50 Years Ago

ON JANUARY 10, at the Hotel Somerset, there took place the 39th Annual Banquet of the Alumni Association, which, according to The Review, "was a large and spirited affair."*

In his address at the Banquet, President Richard C. Maclaurin said: "Much has happened of importance since your last banquet, but I feel that everything else is overshadowed in interest and importance by the great doings of yesterday. . . .

(At meetings held simultaneously on January 9, the Harvard Overseers and the Institute Corporation approved a plan submitted jointly by Presidents Lowell and Maclaurin whereby the two institutions were to engage in co-operative instruction and research in the fields of civil and sanitary engineering, mechanical engineering, electrical engineering, and mining and metallurgy, these being the areas in which Harvard then carried on work.)

"What, then, is this plan? At least it has the merit of simplicity, for in essentials it is simply this, that in the future Harvard agrees to carry on all its work in engineering and mining in the buildings of Technology under the executive control of the President of Technology, and what is of the first importance, to commit all instruction and the laying down of all courses to the Faculty of Technology, after that Faculty has been enlarged and strengthened by the addition to its existing members of men of eminence from the Faculty of Harvard's Graduate Schools of Applied Science . . . The plan enables each institution to control the appropriation of the funds that each supplies, and in no way whatever limits the freedom of each in laying down such regulations as it pleases with reference to the degrees it may grant.

"If any man sees loss of independence here, he has a keener sight than I . . ."

► On January 14, at the Annual Dinner of the M.I.T. Club of New York (then styled the "Technology Club"), President Maclaurin was presented with a pair of "handsomely mounted beavers with the suggestion on behalf of the Club that this animal be duly adopted as the mascot of the Institute on account of its unique industry and its modest and inconspicuous acquisitiveness, symbolical of Technology in general and Technology's President in particular." Dr. Maclaurin gracefully accepted the gifts "and adopted the beaver as the formal mascot of the Institute"—which action was ratified unanimously by the Alumni Council at its meeting January 19.

The presentation of the beavers to President Maclaurin was made by *Lester D. Gardner, '98,* who explained: "We first thought of the kangaroo, which like Tech goes forward by leaps and bounds. . . . Then we considered the elephant. He is wise, patient, strong, hard-working and like all men who graduate from Tech has a good tough hide. But neither of these were American animals. . . ."

► Two new alumni geographical groups were formed: at Duluth, Minn., the "Technology Club of Lake Superior," now known as the M.I.T. Club of Duluth; and at Indianapolis, the "Indiana Association of the M.I.T.," which today continues to bear that title.

75 Years Ago

"THE TRIUMPH of the grind is close at hand," wrote the Editor of The Tech. "The man who has not seen a foot-ball game, or been to the theaters, or had his hour of exercise in the gym, but has jackknifed himself over his desk every night till the clock began to strike the small numbers, will now reap his hard-earned reward . . . as the Semies draw nigh."

*The price of the dinner quoted by the Somerset to the Alumni Association "was $2.50 to include a cocktail and two cigars for each person."

Class News

'91

Francis Bradford Choate died September 10, 1963. He passed away at his home in San Mateo, Calif., in his 96th year. He came from a noted family in Salem, Mass., and his ancestors run back to the Pilgrims who settled Plymouth in 1620, as his middle name indicates. He went to the Western country after graduation and lived there for the rest of his life. I quote from a letter to me written in Carmel-by-the-Sea, Calif., on February 6, 1958: "I went West in the latter part of the 1880's. I arrived soon after the Indians left in a raw unsettled country, Nebraska and Wyoming, and helped develop it; then to Oregon and Washington, California, Utah, Idaho and Colorado, spending years in each territory. It was a great education and a pleasure."

In all his letters, some of them long, I never found a yearning for the East, the old home or memories of entering M.I.T. in 1887 with the rest of us. There is just one exception to this. When he moved into his last home, he wrote: "We are now nearly settled, things all nearly unpacked, but the movers in the warehouse lost the base of my nice old (A. Wilson) grandfather's clock—about 1790—which I took out of the Choate House at Essex, Mass., in 1900. Of course, that upset me and Rose, but I guess this is the last move." This was written in February, 1961. In May 16, 1963, four months before his death, he wrote: "I had a very pleasant incident occur recently. A Mr. J. H. White phoned Rose and said he read (about us) in the April Review, and he wanted to meet me. I could not figure out who he was, but we had him over today. I find that he is a sanitary engineer Class of '09. He was born at Methuen, lived at Medford, married and has moved here to live with his daughter in San Mateo. We had a delightful visit and think we will see them again. Evidently he was lonesome. We old fellows get that way." He signed his letter "Love to you both (me and my daughter) from Rose and your admirer, Brad."—**W. Channing Brown,** Secretary, 15 Forest Avenue, Hastings-on-Hudson, N.Y.

'95

Our 10 remaining members reading these notes may enjoy seeing, on the cover of the September, 1963, issue of 'Fortune' magazine, a reproduction of an artist's profile of **Alfred P. Sloan, Jr.,** author of "My Years With General Motors, Part I" which is printed on page 135 and the 10 following pages. Part I is entitled "A Quarter Century of Glorious Creation—And a Downfall." In the next issue, Mr. Sloan describes General Motors hammering out policies of organization and marketing only to skirt disaster by not following them. If you do not subscribe to 'Fortune' or find one in a local store, you can get it at your local library.—**Andrew D. Fuller,** Secretary, 120 Tremont Street, Boston, Mass.

'96

From the Schenectady Gazette comes the story of **Will Coolidge**'s 90th birthday: "Dr. William David Coolidge, world famous General Electric Company scientist, was honored on his birthday, October 23, at a meeting of the G.E. laboratory staff; he became the third United States citizen to receive the Roentgen Medal for his contributions in the field of X-ray science. Presentation was made by Dr. Richard Seifert, Chairman of the Society of Friends of the German Roentgen Museum, on behalf of the Mayor of Remscheif-Lennep where Roentgen, discoverer of X-rays, was born." The biography of Coolidge, publication of which was instigated by G.E., made its first appearance at this meeting. (More about this biography at a later date, after the secretaries have carefully read the autographed copy they have received, while continuing to marvel at the physique that has withstood 90 years of extraordinary activity.) A celebration dinner at the Mohawk Club was held at which resolutions were presented on behalf of the directors of G.E. by the executive vice-president, Cramer W. La Pierre: "Dr. Coolidge has brightened the world through his major contributions to electic lighting and has made mankind healthier through his research on X-rays and has contributed to human progress by helping establish a pattern for industrial scientific research."

On October 28 at the annual dinner-meeting of the Schenectady County Chamber of Commerce, the "Creator of the Coolidge X-ray tube was presented with a certificate of recognition by the County Chamber for "outstanding contributions to mankind." Mayor Ellis bestowed upon him the city's highest honor, the title of "Patron," and called him "the most beloved citizen in the community." In a brief speech Coolidge said "from the start (1905) the people of this city made me feel at home, as they still do." In Schenectady, the Dental Society also presented the doctor with a plaque at their meeting on November 1, honoring him for the part his X-ray tube has played in the advancement of dentistry.

From **Walter S. Leland** Company, Emeryville, Calif., Leland wrote: "Your letter was a reminder to me, and I have just called **Charlie Hyde** and had a very pleasant conversation with him. He is about one-and-a-half years older than I, and is now suffering from glaucoma, which cost me my eyesight 20 years ago. On June 1, 1962, after a very brief illness, shortly before our 55th wedding anniversary, my wife passed away." Last December Leland went to the hospital for the fourth time and was discharged in June, much to the surprise of the heart specialist. He is in excellent condition and goes to business once or twice a week to keep in touch with the situation.—**James M. Driscoll,** Secretary, 129 Walnut Street, Brookline, Mass.

Happy Birthday

Congratulations are due in January for an Alumnus who is celebrating his 95th birthday; and for 2, 8 and 14 Alumni who are celebrating, respectively, their 90th, 85th, and 80th birthday anniversaries, as listed below with dates of birth:

January, 1869—RAUL DE R. CARVALHO, '92, on the 1st;

January, 1874—FREDERIC S. ATWOOD, '97, on the 6th; and EDGAR M. HAWKINS, '97, on the 17th.

January, 1879—EMORY S. LAND, '07, on the 9th; LLEWELLYN L. CAYVAN, '00, on the 13th; EDWIN F. CHURCH, JR., '01, and RICHARD W. SENGER, '05, on the 17th; JOHN R. MARVIN, '02, on the 18th; LAWRENCE H. LEE, '03, on the 21st; SAMUEL C. LIND, '02, on the 25th; and BENJAMIN F. CLARK, '01, on the 29th.

January, 1884—THOMAS SPOONER, '09, on the 1st; FREDERICK C. HARRINGTON, '11, on the 4th; THOMAS W. ROBY, '07, on the 6th; JOHN E. LYNCH, '05, on the 9th; FREDERICK BACHMAN, '07, on the 10th; GEORGE F. MAGLOTT, '10, and JOHN R. RANDALL, '07, on the 11th; WALTER G. EICHLER, '05, on the 13th; THOMAS H. ATHERTON, '09, on the 16th; EDWARD O. SCRIVEN, '10, on the 20th; DONALD H. MAXWELL, '08, on the 22nd; H. DALAND CHANDLER, '08, on the 23rd; IRVING H. COWDREY, '05, on the 26th; and HOWARD L. OBER, '06, on the 30th.

'98

In the December Class News we mentioned the passing on May 19, 1963, of **William A. Wilder** of Worcester. A copy of the Worcester Evening Gazette of last May 21 is now in our hands and we quote it as follows: "Funeral services for William A. Wilder, 89, who died Sunday in Shattuck Nursing Home, will be held at 3 P.M. tomorrow in Ellen Rogers Kennedy Memorial Chapel at Rural Cemetery. Reverend Dr. Wallace W. Robbins will officiate. Burial will be in Rural Cemetery. Mr. Wilder, formerly of 20 Dayton Street, was graduated from M.I.T. in 1898. He once served with the Internal Revenue Service in the Boston area. He was Worcester office manager for the Massachusetts Division of Employment Security for nearly 30 years. He retired in 1944. His wife, Marian G. (Hall) Wilder, died on February 26. Mr. Wilder was born in Columbia, S.C., and had lived in Worcester for many years."

Our classmate **Fred Dawes** was honored at a testimonial on the afternoon of Sunday, October 20, 1963, in the church of the First Unitarian Society at Hudson, Mass., for his many years of service to this church. Two of his classmates, **Joe Riley** and **Fred Jones,** were happy to attend and extend to Fred the greetings

Deceased

CARL H. BUNKER, '91, Feb. 14
FRANCIS B. CHOATE, '91, Sept. 10*
LAWRENCE L. GAILLARD, '97, July 13
CHARLES L. HAMMOND, '97
M. DEKAY THOMPSON, '98, Nov. 5
FRED I. TUCKER, '00, Nov. 4
WILLARD W. DOW, '01, Oct. 15*
ROBERT F. CRARY, '04, Aug.*
ROBERT FAULKNER, '04, July 26*
HARRY R. GABRIEL, '05, Sept. 7*
JOHN G. BARRY, '07, Sept. 28*
JOHN KIMBALL, '07, Oct.*
GILBERT SMALL, '07, Oct. 22*
HARRY O. PENLAND, '10, March 21
FREDERICK H. STOVER, '10, Aug. 20*
HERBERT P. JOYCE, '11, May 10
ROGER M. SPENCER, '11, Feb. 26
HENRY F. GOLDSMITH, '17, Oct. 27
DONALD S. CLARK, '18, June 6*
MRS. P. B. CROCKER, '19, Oct. 17*
HERBERT DE STAEBLER, '21, Nov. 2
EDWARD F. ENGLISH, '22*
HAROLD A. MOSHER, '22*
JOHN E. SALLAWAY, '22*
JOHAN C. FALKENBERG, '24, July 13
A. B. WHITEHOUSE, '25, Oct. 4*
FRANCIS W. MCCABE, '28, March 27*
THEODORE B. PERKINS, '28, Aug. 8*
ARTHUR F. SCHNEIDER, '28, Oct. 3*
JOHN V. FAGAN, '31*
JOHN M. KIMBLE, JR., '32, Oct. 1*
MANDELL D. STOLLER, '34, Aug.*
DAVID R. LAWLER, '42, March 1, 1962
ROBERT W. GARDNER, '46

*Further Information in Class News.

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from his class. Our President **Ed Chapin** was in Gradyville at the time and was unable to attend but sent his regrets and best wishes. We were happy to meet Fred and his family and friends and to feel first hand the warmth of the love and admiration the church and members of the community hold for him. The Hudson Daily News printed a front-page article the following Monday, which reads: "A record of 50 years of outstanding service to the First Unitarian Society, Hudson, was recognized yesterday when Fred B. Dawes, moderator of the Society, was honored at an open house observance held at the parish hall. Former and present parishioners called and enjoyed a social program and extended greetings to Mr. Dawes. Many old time associates, including two classmates from Massachusetts Institute of Technology, and George Spofford, Tufts, 1901, were present. In the receiving line with Mr. Dawes were his son, Robert T. Dawes, President of Thomas Taylor and Sons Company, and Mrs. Julien Steele (Mary Dawes), West Newbury, a daughter. The honored guest was presented a framed illuminated scroll bearing a tribute to his long service. John Coolidge was chairman of the reception committee and made the presentation. Other tributes were offered by Howard Mayo, chairman of the church standing committee, and Miss Ruth Walcott, a parishioner, who prepared a testimonial." The News-Enterprise, another local paper, also printed a front-page article as well as the following editorial: "Well done, Thou Good and Faithful Servant. Fifty years is a long time to serve any cause, but Fred B. (Cap) Dawes has done just that. On Sunday he was honored by the First Unitarian Society of Hudson for his 50 years' service as its moderator and in various other capacities. When a person serves in some capacity for a long period of time, it is an easy thing to fall into a pattern, to lose enthusiasm for the cause, to let it become routine. Fred B. Dawes is an excellent example of a devoted servant not only to the church, but to his country and his community. He is typical of the many who faithfully work over the years for churches, schools and many other charitable causes. Volunteer work is often discouraging, for it is probably the most unappreciated and often unnoticed of human deeds. Those who year after year work quietly, efficiently and patiently, without any thought of reward, are the strength of our nation and our community. So to Mr. Dawes and all the nameless volunteer church workers he typifies, we offer our affection and gratitude with the words from the Bible, 'Well done, thou good and faithful servant.'" Both papers showed a group picture which included Fred and his two classmates.

We have not heard from our classmate the Reverend **Donald N. Alexander** for many years; the last time was at our 50th at the Brookline Country Club when Donald gave the blessing at dinner. Your secretary decided to make a call and found Donald in his apartment at 20 Catherine Street, Worcester, Mass. He has lived there since 1918; and he retired from the Episcopal ministry in 1946. As he had never married, he was living alone but his friend and neighbor in the lower apartment is taking good care of him. He is living very comfortably, he says, and limitations do not seem to bother him. It was an enjoyable visit for us both. Donald wished that greetings be sent to the class. . . . **Roger W. Babson** is now located in Florida for the winter. His address is Mountain Lake Club, Lake Wales, Fla.—**Frederic A. Jones,** Secretary, 286 Chestnut Hill Avenue, Brighton, Mass.; **Edward S. Chapin,** President and Class Agent, 271 Dartmouth Street, Boston. Mass.

'00

Fred A. Tucker passed away on October 30, 1963, after a long illness. He prepared for M.I.T. at the Mechanics Arts High School in Boston and entered with our class, enrolling in mechanical engineering. For some years after our graduation he was engaged in construction work and was for a long time with the Aberthaw Construction Company of Boston. In 1933 he became associated with the Public Works Administration in Boston and in 1938 with the Federal Works Administration in Boston and New York. In 1944 he suffered a shock and retired from business. His wife died in 1957 after which he made his home with his daughter. Some months ago he entered a nursing home in Norwell, Mass., remaining comparatively well until a recent severe shock proved fatal. He is survived by a daughter, Mrs. Grace T. Holden of Braintree, Mass., and a sister, Mrs. Fay T. Richardson of Littleton, Pa.—**Elbert G. Allen,** Secretary, 11 Richfield Road, West Newton, Mass.

'01

I received some very sad news this last week. Our Vice-president **Willard W. Dow** died on October 15. I have no other information. If anyone knows the details of his passing and will let me know, I will relay them to the class. He will be greatly missed. He was always ready to do more than his share of the work and to take responsibility. . . . **Bob Derby** writes that he recently made an interesting trip. He flew from New York to Iceland, spent a few hours there and then flew on to Glasgow and London. This was the end of August. After four days in London he went to Southampton and boarded the 'Stella Polaris' of the Clipper Line and cruised for three weeks, first touching at northern Spain, then Casablanca and Morocco. After that, in the Mediterranean, he visited Tunis, Istanbul, the Greek islands, Athens and Naples. From Naples he flew to Cannes and returned to New York on the 'Independence' of the American Export Lines. . . . There will be no class notes in February when the annual class letter will appear. —**Theodore H. Taft,** Secretary, Box 124, Jaffrey, N.H.

'02

Ambrose Bourneuf and **Royal Wales** were together in the Haverhill High School, and when they entered M.I.T. they roomed together. They have maintained their friendship since those days mainly through letters. Last summer Wales gave Bourneuf a brief summary of his career since leaving M.I.T. and Bourneuf passed it on to me as another old friend of Wales. Since I found the letter very interesting I seized upon it for the Class News and with Wales' assent give it below: "I'll try to give you a glimpse of what has happened to me since the old days remembered so well. As you probably know, I stayed on at Tech for two years as assistant to Dr. Gill. In the meantime as a member of a quartet in Haverhill, I had the good fortune to meet a very attractive schoolteacher. On August 15, 1904, I did the most important and luckiest thing in my life—went down to her home on Penobscot Bay and married her. I got a new job as an instructor in mechanical engineering at the State College in Raleigh, N.C., and we started life together in the South. A year later I transferred to the University of Tennessee at Knoxville as assistant professor of experimental engineering, and we enjoyed our stay there for three years. While there our first son was born. Through an agency I learned of an opening as head of the Mechanical Engineering Department at the Rhode Island College of Agriculture and Mechanical Arts at Kingston, R.I. While we hated to leave our

connections in Knoxville, the chance to get nearer home and the opportunity to build up a small but potentially first class institution was very attractive. So in 1908 we became residents of Rhode Island. Except for a period of about eight months during which I was on leave to do some research work at the Bureau of Standards in Washington, we have been here ever since. We have been very happy here, and raised three sons—two born here. I continued at the college for 37 years until 1945, when I was 67. As our law requires retirement at 70 and as the war had pretty well disrupted things, requiring a pretty general rebuilding of program, etc., I came to the conclusion that it was the psychological time for me to step down and let a new man make his own fresh start. The president and board were good enough to ask me to accept an honorary degree of Doctor of Engineering in recognition of my long term of service. My reply was that since practically my whole life had been given to teaching I really had nothing to show as engineering achievement, but if they were willing to accept the title 'Doctor' in its original meaning of 'teacher,' I should be happy to accept. Still later, with the State College becoming the University of Rhode Island, and the rapid growth of facilities, they have done me the honor of naming one of our new buildings the Royal L. Wales Mechanical Engineering Building. In 1931 Mrs. Wales, my youngest son, and I took a trip through Europe. After my retirement we drove to Florida for one winter. Later we took an interesting trip through our Northwest and up into Alaska. But days of travel are over now and we are thankful to be as well as we are and spend most of our time right here. I have had a lot of fun painting and doing ceramics—and keep busy in my shop in the cellar."

Dan Patch has an extra copy of the '02 Technique and would be glad to pass it on to anyone who would like it. His address is Box 193, Friendship, Maine.—**Burton G. Philbrick,** Secretary, 18 Ocean Avenue, Salem, Mass.

'03

Well classmates, as your secretary looks into his crystal ball and visualizes his expectant readers waiting for something humerous on electrodynamics, as Professor Arlo Bates would say "there is a depressing lack of words visible from you scribes." We northern members are confined to rugged New England's rocky shores and lashed by gale winds and blustery rain heralding the arrival of conditions of Whittier's "Snow Bound." Accordingly, we envy you classmates basking in the sun's rays on Florida's shores or in the torrid temperatures of Southern California. Why not send even a brief news item about your present or past interesting careers? . . . Recently the Institute announced the completion of a new home for M.I.T. coeds, a truly unique structure that adds further glamor to the river front.

Since our popular **Sophie Thayer** (Mrs. Arthur **Blunt**), VII, recently passed on, your secretary will be very pleased to welcome, at our next Alumni Day Reunion, Miss **Lillian Gleason,** VII. She has been living quietly, but alert to alumni news, for some years near Rye, N.Y. She is enjoying remarkable health in apologetic retirement, after 23 successful and enjoyable years with the Cleveland, Ohio, Board of Education. . . . **Walter Regestein,** V, from Wilmington, Del., extends his appreciation for the photographs of the '03 60th Reunion banquet we sent. He notes the mature changes in our former classmates and writes: "I am somewhat shaky on my feet at times, but on the whole I guess I am in a fair shape." Congratulations, Reggy; my mail discloses that some of our members have to play golf from a wheel chair! . . . **George Capelle,** XIII, whom I recently visited enjoying his retirement with daily walks, relates that he could no longer break a record on the old Tech track, but would come in so late as to be the winner in the next race!

Of interest to your secretary when he visited the Mt. Auburn Cemetery in Cambridge last Decoration Day, was to note in the lobby there a two-volume "Life and Letters of William Barton Rogers," the first president and founder of M.I.T. . . . Our 'Happy Birthday' congratulations for November went to Miss **Julia Pulsifier,** VII, Auburn, N.Y, and to **Clyde MacCornack,** I, of Phoenixville, Pa., on their 85th birthdays.—**John J. A. Nolan,** Secretary, 13 Linden Avenue, Somerville, Mass. **Augustus H. Eustis,** Treasurer, 131 State Street, Boston.

'04

We have received from the Alumni Office a revised list of living classmates. This includes all who took courses with us regardless of degree status. Sometime after the first of the year we plan to send this list to all members of the class in hopes that we will receive some information regarding them for use at our 60th Reunion in June. There are 110 names on the list as follows: Course I, 19; Course II, 23; Course III, 9; Course IV, 13; Course V, 24; Course VI, 18; Course VII, 2; Course VIII, 6; Course IX, 1; Course X, 3; and Course XI, 2. . . . Several ideas for our June reunion are cooking but nothing has been decided yet. If you have any thoughts to flavor the brew they will be welcome but should be sent in very soon after you read this. Our treasury is rather anaemic so we can't plan anything very elaborate.

We have received belated notices of the passing of two classmates. **Bob Faulkner,** Course III, died at Schaefferstown, Pa., July 26, 1963. For most of his professional career he worked for the Bethlehem Steel Company. At the time he retired he was manager of their ore treatment plant at Lebanon, Pa. . . . The Keene, N.H., Sentinel of August 15, 1963, reported the death of **Robert Fulton Crary,** Course I, who was a direct descendant of Robert Fulton of steamboat fame. His career was primarily in banking, and he became a vice-president of the National City Bank of New York. In World War II he served with the War Production Board. On retirement he settled in Westmoreland, N.H., where he was active in civic affairs.—**Carle R. Hayward,** Secretary, Room 35-304, M.I.T., Cambridge 39, Mass.; **Eugene H. Russell, Jr.,** Treasurer, 82 Devonshire Street, Boston.

'05

In response to my letter to **George W. C. Whiting** I, congratulating him on his 80th birthday (November 1), and welcoming him into the glorious order of octogenarians, I received an answer, which I am quoting in part: "Thanks for your letter of October 30 and the well wishes it contained. Time certainly marches on. Here we are, both 80 years old, and 58 years removed from our graduating year of 1905. That is a very long time and I know many things have happened to both of us, some of which we never anticipated in 1905. It is interesting to learn that some of our classmates are still at their desks as I am. I am not as active as I have been in past years, due to the fact that I have lost a large amount of my eyesight and have difficulty reading anything, even with a powerful magnifying glass. Outside of that I am in fairly good health. I am now chairman of the board of my company and have given to the other officers a large amount of routine business and active direction of the company affairs. I still go to the office every day and keep myself advised of everything that is going on and still control the financial details. My company has been my life's interest and work, and I propose to continue as long as I am able to. I still feel that I am able to contribute a great deal and as long as this continues, then so will I." . . . As a retiree I glory in his continued love of his business life. We have others apparently intending to die with their business slippers on, namely Willard Simpson, Hub Kenway, Charlie Smart, Doc Lewis, Frank Carhart, Sid Caine, Jack Flynn, Myron Helpern and Izzy Nye. If I have left out anyone, please correct me.

This reminds me that **Hub Kenway,** commenting on an interview with a client, Omar S. Swenson, '03, gave the story of the origin of the Tech Stein. Here's Hub's story: "When President Pritchett suggested that Tech men didn't drink enough beer there was no Tech stein. That was designed by Omar and his roommate. They went to Jones, McDuff and Stratton with an initial order of 200 steins at 25¢ each and sold them at 75¢ a piece—mostly through the 'Cage'—remember, under the stairs in Rogers? That's the origin of the Tech stein. Of course I'm figuring on doing a lot of patent work for Omar's company on its new machinery. Neither of us is in condition for retirement for another 10 years." . . . In spite of several attempts to get more detail on the death of **Harry R. Gabriel,** I, I can only report that he died on September 7, 1963 at his home in Cincinnati. . . . **Wallace Taylor** tried to

help, but there was no obituary in local papers and a letter to Harry's widow brought no reply. Thanks, Wallace for trying. . . . I have these temporary changes of address: **Francis F. Longley** XI, Brickell Town House, 2451 Brickell Avenue, Miami, Fla.; **Edward J. Poor,** VI, 709 Idlewyld Drive, Fort Lauderdale, Fla. We have classmates living in Florida, mostly permanently, in Clearwater, Fort Lauderdale, Miami (3), Orange City, Pensacola and Sarasota. I do not know Florida geographically but it may be that some of these fellows will be traveling state-wide. I will gladly send addresses, should someone be interested in contacts with classmates.—**Fred W. Goldthwait,** Secretary, Box 32, Center Sandwich, N.H.; **Gilbert S. Tower,** Assistant Secretary, 35 North Main Street, Cohasset, Mass.

'06

A year ago I started the notes by telling of a mid-November "winter-wonderland" but this year it's different, with fine autumn scenery and weather while parts of Florida have had temperatures in the twenties. Also in those notes I reported that Marion and I had visitd **Jim Kidder** and his sister in Winchester and so we did again, in October, finding Jim about the same as we sat on their porch and chatted about class affairs and classmates. We saw some of Marion's classmates too on that trip, a couple of 1910 Wellesley gals. . . . The latter part of October a very interesting reply came to the letter of sympathy I had sent to Professor **Philbrick**'s widow in Evanston; the letter was written by Miss Frances for her mother. I had enclosed a copy of that part of the December notes about the professor, which they had "read and reread—with great interest and appreciation." She also said: "We were delighted with the quotation about his retirement, a remark he chuckled over many times." It seems I also helped them to connect a name they see often in the 'Chicago Tribune' as editor of religious news, Richard Philbrick, son of Burton, '02, with whom she once talked by phone: "We both acknowledged that we didn't know where Herbert A. Philbrick (the man who Led Three Lives) fitted into the increasingly large Philbrick clan, but assumed we were all descended from Thomas Philbrick who reached New Hampshire in 1630. Father enjoyed making a Bible Box to hold the family Bible of that date. He had just finished the last draft of a section of Philbrick genealogy he had been working on for months, a few minutes before he died. We are thankful he was well and active to the last second. We have been brought up on stories of M.I.T. and are pleased to have the tribute." How can we judge how much Professor Philbrick contributed to the well-being of America and the world, and the people therein?

Stew Coey, VI, finally did see **Joe Santry,** VI, resulting in the following letter from Joe early in November: Stu Coey dropped into the office the other day and asked why I did not forward to you the copy of the honor that had been bestowed upon me by the Italian government. That happened last spring, and I promised him that I would send the information either to him or to you. You will, therefore, find enclosed a copy of the award. I have been informed that this is the highest honor that the Italian government can bestow on a foreigner. Combustion Engineering, Inc., of which I was president and chairman for many years, has been very active in Italy since the inception of the Marshall Plan, either singly or in combination with our licensee, the Franco Tosi Company. We have built for the Italian utility industry about 50 steam generating units totalling 5 million KW. The largest unit is now under design. It is a super-critical boiler and will have a capacity of 600,000 KW. . . . I believe the Italian utility power plants are as modern as any in the world, and I expect that the award of this honor was made to me because of my association with this work during the past 15 years." So much for his letter; the award from Il Console Generale D'Italia, dated February 8, 1963, reads: "Dear Mr. Santry: It is my pleasure to inform you that, pursuant to a proposal of this Consulate General, the President of the Italian Republic has conferred upon you the rank of Commander in the Order of Merit of the Republic of Italy. I wish to express my sincere congratulations for this well deserved honor which is bestowed in recognition of your valuable contribution to the strengthening of the friendly relations between the United States and Italy. With my best personal regards, Sincerely, signed, Ruggiero Farace di Villaforesta, Minister Plenipotentiary." Joe received another award back in 1956 when Manhattan College conferred on him the degree of doctor of engineering.

In the July, 1960, notes I told of having a phone talk with **C. M. Emerson** while we were visiting in New Rochelle. After returning home I wrote to him, enclosing an outline of his career and soon received a reply with additional information. Since then I have received a couple of cards from him, one of Joe's Pond showing the attractive landscape in that part of West Danville, Vt., near where for some years Carl had spent his summers. More recently, one from Braintree told me that "I am now making my home at our old homestead with my two sisters and my brother and his wife." . . . **Carleton Murray Emerson,** II, died August 27, 1963. He was born in Brockton, Mass., in 1884, prepared at Thayer Academy, and entered with our class in 1902, but did not return for senior year. He was on the '06 Relay Team freshman year and in the 5th Annual Tech Show, "The Scientific King." He was one of the five '06 men who were in the Gypsy Dance and the Flower Dance. Instead of continuing senior year, Carl became manager of the branch factory of Boston Last Company in Richmond and Quebec; later he was a time study engineer with H. L. Gannt Company at the Sayles Bleachery in Rhode Island. In 1907, he began his 10-year connection with the well-known Boston materials handling concern, the Lamson Company, which he served in engineering and sales capacities, in Boston, Philadelphia, St. Louis, New York City, and Baltimore. His World War I service was as "Chief, Order of Work Branch, Estimates and Requirements Division; Progress Section, Ordinance Department, Washington, D.C., September 18–January 19." Then for a couple years he was assistant general sales manager of Standard Conveyor Company in Chicago, before another 10- or 11-year stretch with the Lamson Company in New York City as special sales representative. From 1932 to 1941 he was an account executive with a New York holding company for several film concerns, then for four years was state regional manager, Rating and Issuance Division, War Production Board in New York City with a year or so as section chief, Materials Handling Division, War Assets Administration. A couple years in New York City were spent with Olson Conveyor Company of Chicago, and five years with Grover Pneumatic Tube Company of Detroit. He retired in June, 1953, to his home in New Rochelle, where he was a master of the Huguenot Masonic Lodge. In February 1914, he married Blanch Burdin Sears, a former Thayer Academy teacher, who died in 1958. They had no children. . . . **Howard P. Shaw,** who is owner of the Melrose Nurseries, now hangs his hat at 46 Broadway Avenue, Melrose.—**Edward B. Rowe,** Secretary-Treasurer, 11 Cushing Road, Wellesley Hills, Mass.

'07

The Fall dinner of the '07 men around Boston was held at the Faculty Club on Friday evening, November 1. Only five men were present: Don Robbins, Tom Gould, Dick Ashenden, Bob Rand, and Phil Walker. After the secretary reported various news items about class members, a discussion of class business was held. It was considered unwise to plan an interim reunion for June, 1964, but to hold to June, 1965, as decided at our last reunion. The treasurer brought up the need of funds, and he was authorized to circularize the class early in 1964. Donations of $5 sent in promptly will be very helpful. After the business meeting, **Phil Walker** showed slides of his trip to Alaska a year ago. This trip was by boat, through the inland waterway of the Alaska panhandle, 1,000 miles from Vancouver to Skagway, Alaska, and return. . . . In the November notes, you read the announcement of **Gil Small**'s wedding on September 3. It is with a real sense of loss that I now record Gil's sudden death on October 22 at his home in Wayland. He had written his intention to attend the class dinner on November 1 but suffered a heart attack while supervising repairs on his house. Your Secretary sent a sympathy bouquet to the family on behalf of the class and, with Mrs. Walker, attended the funeral services at the First Parish Unitarian Church in Wayland on Friday, October 25. Letters from Mrs. Small and Gilbert Small, Jr., expressed the thanks of the entire

family for our sympathy and thoughtfulness. We will miss Gil very much, as he was a regular attendant at our class gatherings and only missed two reunions.

Bill Otis finally got settled in his summer home at North Chatham, after moving up from New Jersey, and is now at his winter home in Naples, Fla. Anyone visiting Florida should look Bill up at 1524 Gulf Shore Boulevard. . . . A letter from Mrs. Kimball told of the sudden death of **John Kimball,** I, in October. He was recovering from a gall bladder operation and doing very well, but had a coronary and died without any suffering. John worked many years for Stone & Webster until 1950 and then was an engineer with the Charles T. Main Company. . . . **Bob Albro,** I, writes of passing his 80th birthday and 52nd wedding anniversary. His four children are married, and live near him in Springfield, Mass. He has eight grandchildren. This year, he has a grandson at Syracuse, one at University of Massachusetts, and one at the Mayo Clinic, Rochester, Minn. Bob's hobby is working up his ancestral line which he has traced back to 1634. . . . **Fred Dempwolf,** IV, has a new address to note on your class list—904 South George Street, York, Pa. . . . **John Frank,** VI, suggests our next reunion should be in 1964, as he feels there will not be enough of the class surviving in 1967. We will try for it in 1965, John. He called my attention to "Business Week" for October 19, 1963, where Don Robbins, Jr., '38, is mentioned in an article on finance on page 168. Don, Jr., is vice-president and treasurer of the Singer Manufacturing Company. It is always interesting to know about the children of our class members.

A newspaper clipping cut from the "Cape Codder" of October 10, 1963, contains a fine cut of **Milton MacGregor,** VIII, who celebrated his 79th birthday on September 10 by taking a six-and-a-half mile walk over the Presidential Range in the Appalachian Mountains in less than four hours. "Mac has been strolling over the Appalachians for so long that most men have been born, retired, and applied for their Social Security in the interval. He became a hut manager for the Appalachian Mountain Club at Carter Notch in 1915, and manager of all the huts in 1921. He saw the hut system grow to its present large size and helped direct much of the growth himself. 'Red Mac' won't be an octogenarian for another year yet, and this may explain why he looks about 59 and could probably walk the legs off a Marine." . . . **Frank S. MacGregor,** VIII, is most co-operative in getting news to your secretary. He reports that he has just "dedicated" a nine-hole putting green and is now in the process of buying the special mower required to keep the grass in proper shape. Frank did his thesis with **Albert E. Greene,** VIII, who has become very successful in the business world of the West. He was president and general manager of the Greene Electric Furnace Company in Seattle, Wash., but is now retired and lives in Medina, Wash. He has two sons who are both ministers and a daughter who is a pilot and flies missionaries and supplies to and between foreign mission stations in Africa and the Far East.

Jim Barker, I, is still active as a director of Sears, Roebuck and Company and of Allstate Insurance Companies, and a trustee and chairman of the Investment Committee of the Sears Profit Sharing Plan, which has a capital value of over $2 billion. Jim spent a week of September in Ireland, where he and his wife enjoyed grouse and woodcock shooting, and the month of October at his camp in Wisconsin. It is very evident that he is physically active and "can negotiate the woods and swamps, gun in hand." . . . **Ed Temple** was associated for many years with our class member, **George A. Crane,** I, in the construction business. George died in 1958. Ed continued the firm until last spring and then decided to retire and close out the business. He has sold their Belmont home and purchased a Cape Ranch house at Marion, Mass., near the waters of Buzzards Bay on Lewis Street. A clipping from the Boston Herald gives the following information: "Mr. Temple is a charter member of the Belmont Royal Arch Chapter, a member of Belmont Lodge, Boston Commandery, and other Masonic bodies. He is one of the first corporators of the Belmont Savings Bank and has been in the construction business for 53 years." In a recent letter from Ed, he wrote: "My eyes have recently troubled me a lot; but with 'Talking Books,' I am getting along very well."

A clipping from the El Paso, Texas, Herald Post of September 30, 1963, notes the death of **John G. Barry,** III, at Grand Junction, Colo., on September 28, 1963. Bryant Nichols heard very little from John during his business life, but it is evident he was very active in business and contributed much to our economy. As president of Texas Western College from 1931 to 1934, he expanded the school; during his administration, it was authorized to award liberal arts degrees. Shortly after graduation, John became chief engineer and geologist for Cortez Associated Mines in Mexico. He worked in various mines in Nevada and was on the faculty of the University of North Dakota. He entered the Army Engineers in 1917 as a lieutenant and ended his war service as a lieutenant colonel, with a citation from General John J. Pershing. From 1920 to 1924, he was chief geologist for the American Smelting and Refining Company in Mexico and Chile. Recently he served as exploration chief for the Atomic Energy Commission. He is survived by Mrs. Barry. Their only son, John, Jr., was killed in World War II.—**Philip B. Walker,** Secretary and Treasurer, 18 Summit Street, Whitinsville, Mass.; **Gardner S. Gould,** Assistant Secretary, 409 Highland Street, Newtonville, Mass.

'08

The first dinner-meeting of the class of the 1963-1964 season was held at the M.I.T. Faculty Club on Wednesday, November 13 at 6 P.M. The following classmates attended: Bunny and Mrs. Ames, Bill Booth, Nick Carter, Ted and Mrs. Joy, Henry and Mrs. Sewell, Joe and Mrs. Wattles. We gathered in the cocktail lounge, and, while enjoying our favorite tonics and the delicious crackers and cheese from the buffet, talked about our summer activities since our 55th Reunion at the Melrose Inn. At about 6:40 P.M., we adjourned to private dining room No. 4 for the usual fine dinner of our choice. After dinner, **Joe Wattles** entertained with Kodachromes taken at Harwichport last June and then with pictures taken on his trip to the North Cape including views of Iceland, Norway and Sweden, Denmark, Holland, Paris and London. It was a most enjoyable evening. We called it a day about 9:45 P.M. We don't know whether we will have a dinner meeting in January or not, as most of our regulars will be in Florida. Let us know if you will come if we do have one then.

We are sorry to report the death of **N. Leroy Hammond** at his home in Ellenville, N. Y., on November 9, 1963. **Karl Kennison** attended the funeral. . . . Dr. **Harold Osborne,** who is mayor of Montclair, N.J., had an interesting article in the August issue of 'Engineer,' published by the Engineers Joint Council. Harold wrote about the place of the engineer in town or city government.—**H. Leston Carter,** Secretary, 14 Roslyn Road, Waban 68, Mass.; **Joseph W. Wattles,** Treasurer, 26 Bullard Road, Weston 93, Mass.

'09

George Wallis, II, received a letter from F. S. Moseley and Company, investment bankers in Boston, announcing the retirement of **Kenneth May,** VI, on May 1 from that firm. He had been associated with it and its predecessor for 34 years. Ken and his wife, Frances, are now living a quiet life at their home in Newton Highlands where they have lived for many years. Ken says that Frances spends most of her time keeping him out of mischief and he does likewise for her. His daughter Margaret (Mrs. Henry Harwood) lives nearby in Waban and has eight children and two grandchildren so that Ken and Frances are now great-grandparents on two counts. His second daughter Elizabeth (Mrs. John E. Dorer) lives in Florence, S.C., where her husband is employed by DuPont. They have four children. Ken's son, George, is comptroller of Amherst College at Amherst, Mass., and has three children. Thus Ken and Frances have 15 grandchildren and two great-grandchildren. Congratulations!

We received a brief airmail note from **Rea Blankenbuehler,** X, mailed from Nyori, Kenya, Africa, in which he states: "Just a note to tell you that I got along so well after my trip around the world I decided to make this African safari. Hope to be home by Thanksgiving. This is a very remarkable country." . . . In the November Review we announced that it was necessary to change our plans to hold our 55th Reunion at the

New Ocean House because Alumni Day had been changed from June 8 to 15. This fall the Reunion Committee has been looking for a meeting place which will meet class approval and hope to make an announcement shortly.—**Chester L. Dawes,** Secretary, Pierce Hall, Harvard University, Cambridge 38, Mass.; Assistant Secretaries: **George E. Wallis,** Wenham, Mass.; **Francis M. Loud**, 351 Commercial Street, Weymouth 88, Mass.

'10

My appeal for news from '10 classmates has resulted in many replies. I won't have space to include all replies this month, but will include them in future class notes. . . . Mrs. Eleanor H. Stover writes that her husband, **Frederick H. Stover** died on August 20, 1963; she enclosed the following clipping: "Word was received here (Louisville, Ky.) of the death of Frederick H. Stover, 76, who for many years was chemist and bacteriologist for the Louisville Water Company. He died in a hospital in Sarasota, Fla., where he had lived since 1957. Stover was a retired colonel in the Army Sanitary Corps and served in both world wars. He joined the water company in 1913 and worked there until World War I, rejoining the company from 1919 until 1941. In 1946 Stover returned to the company until his retirement in 1952. He was a life member of the Louisville Engineers and Architects Club, a 50-year member of the American Water Works Association, and a member of the American Public Health Association. Stover, a native of Newburyport, Mass., was a 1910 graduate of M.I.T."

James Wilford Kellogg, Morehead City, N.C., writes: "Thank you for your nice letter. I have never considered that I belonged to the '10 class. I was a special graduate student while I served as laboratory assistant to Dr. William T. Sedgwick, Head of the Biology Department. After a short tenure as laboratory assistant at the then new Filter Plant at Washington, D. C., I went to Raleigh N.C. (State Laboratory of Hygiene) where I served for 40 years. I retired in December, 1948." . . . **Cecil K. Blanchard,** Lima, Pa., writes as follows: "Your plea for news touches a soft spot for I have had the same problem, so, though I am probably only a name to you, I will answer at once. You see, I was at M.I.T. only a year, after graduating from Amherst, and taking work in Public Health in Course VII. Good old Course VII prepared many men better than I for useful service to men; men who are now long dead, together with Sedgwick, Winslow, Prescott, Phelps and others. I was health officer of Wellesley for three years and then for 35 years was bacteriologist and epidemiologist for the New Jersey State Department of Health, Trenton. I could write a book on exciting times with smallpox, typhoid, diphtheria and polio epidemics, of no interest now to anyone but me. After retiring, Mrs. B. and I went to Vermont, a beautiful place in summer but too cold for too long in winter. So, back to New Jersey and a year ago to a nice apartment in our daughter's big home in Lima, Pa. One reason I am not known to '10 class members is that nearly all my associates at M.I.T. were '09 and, as I commuted from Quincy, had little social contact with M.I.T. men except in class. That's the story. I don't expect you to use any of this but it was good to know I am still considered M.I.T. '10."

James Roe Stevenson, Cayuga Fruit Farm, Cayuga, N.Y. writes: "Your letter at hand. Thank you. I was at M.I.T. just a few weeks early in 1907 in Water Analysis and Bacteriology. My health was not good, so I took over my grandfather's farm on a shoestring and have been fruit and general farming ever since, even now at 81. This fall we are harvesting an excellent 30,000-bushel fruit crop. My oldest son has been in fibres research at DuPont for 25 years. Our younger son has a good position with Olin on fertilizers, and our daughter is child welfare agent for Wayne County. I was Williams '05, and my wife, Grace Fairchild, is a Wells College '06 graduate. The expansion of M.I.T. since 1906, amazes me." . . . **Robert F. Burnett** writes that he is now with E. R. Davenport and Company as a registered representative of the New York Stock Exchange, to handle any type of investment transaction. He states: "Now that I have reached an age of maturity, perhaps it is time to become more frivolous and to obtain a new outlook on life. My oldest grandson, a graduate of Connecticut Wesleyan, is a member of the "Highwaymen," a singing and entertainment group of five boys. Their outstanding success, "Michael Rowed the Boat Ashore," has sold over one million records."

George Smith Thomas of Carroll, Iowa, writes: "The list of living graduates was much larger than expected and intimates that all Tech grads live clean, healthful lives in order for so many to survive to such an age. We note on this list the names of five graduates from Course XIII (including the writer), all of whom we knew well and with whom we were closely associated in the small group taking that course at the Institute. It was our privilege to attend the 50th Reunion in 1960 where we saw some of these as well as some others not now living. After graduation, I worked in naval architecture and marine engineering at the Sparrows Point Yard of the then Maryland Steel Company, later at Philadelphia at William Cramp and Sons Yard, and during the First World War with the Emergency Fleet Corporation in Washington and Philadelphia. After 1923 I turned from the glamor of that work to the more prosaic but more substantial family business of selling lumber and building materials in Iowa where I have been ever since. After years as an executive and director of this company, I retired in 1954 and have been living a comparatively quiet life ever since. We took a 10 weeks' tour of Europe immediately after retiring and two years ago this last winter a 61-day Mediterranean cruise, so the whole time has not been spent in rusticating. We spend five months in Florida every winter and three months in the summer at our lakeside home at West Okoboji in northern Iowa.

"The world we live in is so entirely different from that we experienced in Boston in 1910, especially in the sciences, and even in naval architecture, that we would be babes in the woods in a classroom today. As a high school boy I subscribed to the 'Scientific American' and read it with understanding; today when I pick up a copy at the public library I do not know what they are writing about. I suppose it is that way in almost every line of research. But, even so we are able to live a happy life and enjoy every day. My wife, whom I married in Sparrows Point, is still living and we both enjoy good health; we have three children and 10 grandchildren, all living and doing well. We have a son and his five children in the same town with us and enjoy their company keenly. All who are old enough are in college and the others are on the way." Next month after my return from Europe I will include more replies from 1910 classmates.—**Herbert S. Cleverdon,** Secretary, 120 Tremont Street, Boston.

'11

The annual "7-11" meeting of the Greater Boston classmates was held on November 7 at the Tech Faculty Club. In spite of a violent rainstorm, nine men turned up for luncheon. . . . In the talk-around which followed, **Obie Clark** reported he is still doing some consulting work for his former company. . . . The **Marshall Comstocks** divide their time between Rockland, Maine and Medford, Mass. . . . **Jack Herlihy** has been appointed to fill the vacancy on the Alumni Council caused by the death of **Emmons Whitcomb.** He read a telegram from our Class President **Howard Williams** sending his good wishes to the luncheon group. . . . **Charles Linehan** announced the arrival of a second grandson. . . . **Roy MacPherson** is still busy building up the morale of disabled veterans, and designing apparatus for the doctors, at the Veterans' Hospital. . . . **Carl Richmond** is still limiting his activity. . . . **Morris Omansky** is devoting about half time to his work as a consulting chemist and rubber technologist. . . . **Suren Stevens** is clerk of the works representing the architect on some additions at the Boston City Hospital. . . . **O. W. Stewart** had some samples of "Protect-O-Net," a screening which he distributes, and helped to develop with the Bemis Brothers Bag Company, for protection against bird damage to fruits and vegetables. It is made of tightly-twisted kraft paper yarn woven into mesh netting and coated with plastic latex. In his capacity of class agent O. W. also had a few words to say about the Alumni Fund. He pointed out that class standings in the Fund are determined by the percent of active members contributing and by the average contribution. Last year 1911 was leading the classes in respect to the

percentage of contributors until, at the last minute, 1909 nosed us out by 2 per cent. Five more contributors would have kept us in first place. . . . The day after the meeting our class agent wrote me the following: "The needs upon the Alumni Fund for 1964 are so urgent that the total goal has been set at $1 million. Although the Fund drive is just getting underway, 28 members of 1911, by November, had contributed $2,860. Can we bring our 1964 participation up to 65 per cent of our roll? Our 1963 total contributions were $6,121, a fine showing. How much can we increase that for 1964?"

Stanley E. Bates, I, died September 19, 1963, in Oak Lawn, Ill. Stanley was born in Sterling, Ill., and prepared at Leal's School, Plainfield, N.J. After two years in the Engineering School at Columbia University, he transferred to M.I.T. He was manager of 'The Tech' his senior year. Upon graduation he entered the service of the National Highway Association in their South Yarmouth office. About 1916 he went to Chicago, where he did special writing and editorial work for a number of scientific periodicals including the 'Engineering Record.' Later he joined the Lee Trailer and Body Company as a vice-president. He was later president of the Tractor and Equipment Company of Chicago, which he organized in 1929. His brother, Charles L. Bates, I, is a member of the Class of 1903.—**John A. Herlihy,** Treasurer and Acting Secretary, 588 Riverside Avenue, Medford 55, Mass.

'12

Professor **Erwin H. Schell** was honored at the 13th International Management Congress in New York and presented with the gold medal of the Comité International de l'Organisation Scientifique. This medal has been awarded only nine times previously and only three times to an American. This is the first time it has been given to a man who is principally an educator. This is a fitting recognition of Erwin's long and distinguished career in teaching and leadership in industrial management. Erwin is now living at Meeting House Hill, Norwich, Vt., with his son Dr. Schell, who is on the staff of the Mary Hitchcock Hospital in Hanover, N.H. They have a most attractive home across the river on a hilltop. . . . **Ralph F. Symonds** is suffering with Hodgkins disease and practically house bound. He has moved to an attractive home on Goldplate Road, Marblehead, where he has a wonderful view out across Massachusetts Bay. He would certainly appreciate a line from any of his old friends.

When in Washington three weeks ago, I phoned **David J. Guy** of 3224 Morrison Street, N.W., Washington 15, D.C., and was sorry to learn that he was house bound. Mrs. Guy reported that he was making a good recovery, however. He would be delighted to hear from any of his old friends. . . . **Raymond E. Wilson,** whose hobby is collecting photographs of covered bridges throughout the East, writes that he has been inactive for the last five years and has gradually become used to this way of life. As he and his wife Helen are in reasonably good health, they travel a great deal, going abroad on alternate years and covering the U.S. in between. He estimates that there are about 1,200 covered bridges in the U.S. and over 350 in Canada. He has personally visited nearly 700. When in Switzerland he found there were about 100 covered bridges and was able to cover a number of those. **Harold Mabbott,** whom Ray sees frequently, is teaching physics at the Pennsylvania Military College. . . . **Jim Cook,** in trying to hurry, fell on his asphalt drive and broke his hip in October. He has been house bound for about two months but expects to get out by December 1. **Harold Brackett** and his niece, Eleanor Forbes, dropped in to see Jim on the way from their former home in Limerick to 515 Summit Avenue, Oradell, N.J.—**Frederick J. Shepard, Jr.,** Secretary, 31 Chestnut Street, Boston 8, Mass.; **John Noyes,** Assistant Secretary, 3326 Shorecrest Drive, Dallas 36, Texas.

'13

Here's to 1964. Happy New Year and the best of health. We have received many letters of appreciation for the Geographic Register; but in spite of many hours of research and checking Alumni Office lists, proofreading by the printer and the Capen family, a few errors crept in and there have been some changes. In **Marion Hart**'s address, insert '37' after Washington; **Scott W. Orr** forwards his dues from Simpson Point, Brunswick, Maine; **John Ladd**'s address should read 300 Seminole Avenue; **Gordon Howie**'s Maine home should be Drake's Island; **Harry Bowman** is incorrectly shown as Barrow. **Raymond Bergen**'s new address is 92 Holland Drive, Demarest, N.J.; **Charlie Edison**'s dues were sent from Waldorf Astoria Towers, New York 22, N.Y.; **Gilbert Pardey**'s name was misspelled; **Charlie Brown**'s correct zip code number is 88029; **Vic Mayper** now resides at 200 Park Avenue New York 17, N.Y.; **Lindsley Hall**'s new abode is 1925 Southwest Main Street, Portland 5, Ore.: **Bob Weeks'** temporary address is Cotter Home, 425 South Walnut Street, West Chester Pa.; **Robert Nowlin**'s address should read Grattan Street. We shall try to correct any errors or changes of address in our monthly notes and will furnish a compehensive list of all changes from the previous year each September.

We must relay the sad news of the passing of **Albion Davis** of Moonville, Mo., on June 26, 1963; he was buried in Waltham at the Fiske Cemetery. Mrs. Davis is expecting to move to Waltham. The Class of '13 mourns with Albion's family. . . . It is noted that Dr. **Arthur Kenney** is still associated with the National Science Foundation. . . . **Pete Haynes** writes that he heard from Bob Weeks and that both Bob and Dorothea are home again, although Bob's eyesight is troubling him. We have received some appreciative letters from several classmates who attended the 50th Reunion, including: Larry Hart; Jack Horsch; Hennie Glidden; Art Hirst; Joe Isenberg; Ed Jewett; Lammy Lemaire; Tom Lough; Millard Merrill; George Richter; Dan Ricker; Ed Hurst; Everett St. John; Charlotte Sage; Dave Stern; Fred Kennedy; Ralph Thomas; George Wallace; Bob Tullar; Ben Thomas; Louis Wright; Gordon Howie; Burt Cushing; Warren Glancy; Bill Brewster; Gene MacDonald; Geoff Rollason; Jack Farwell; and several others. . . . **Bill Mattson** wrote a very interesting letter, in which he elaborated on his and Joel's trip climaxed by the reunion and many other visits, then back to Golden, driving over 5,000 miles. Bill has been elected chairman of the Jefferson County Red Cross Chapter and is interested in Republican politics, so don't be surprised if you hear his name as a candidate in Colorado. . . . We have also received some very interesting and welcome notes from Bob Weeks, Neva Ready Murphy; Bill Herbert; Malcolm Lewis; and Fred Lane. We have also been pleased to hear from many of our classmates who were unable to attend the reunion, including: J.W.B. Ladd; Gene Burrell; A. C. Besosa; Jim Beale; George Dempsey; Hyman Shoub; Ellis Hartford; John Foley; Charles Walton; George Sickels; Johnny Welch; C. Lalor Burdick; Joseph Paul; Ed Taft; Charles Albert Smith; Leon Parsons; Robert Daggett; Stan Parker; Sam Knight; Harry Wright; Roy Block; Robert Nowlin; Rhys North; Howard Fessenden; Walter Whitehead; and several others.

George Wallace, President of Fitchburg Paper Company, is still making money for his stockholders according to the published reports of dividends declared. . . . We have received a very lengthy letter from one of our gentleman farmers, **Mayo Tolman.** He regrets that he was unable to attend the reunion for several reasons: 1) The President and Congress with "Fabian Utopics" have depleted Mayo's net income to a frayed tip of a shoe string; 2) he has suffered several ailments and accidents, such as bladder trouble (which was repaired, possibly vulcanized), a foot injury resulting from stepping on a nail (two operations later that was solved but he walks like a toe dancer), and a broken arch in the other foot which he incurred jumping on a shovel to dig a hole in clay while wearing sneakers. Well, Mayo, you had better try knitting. We heard that Mayo's cousin, Amy Mayo Mann, has moved to Swampscott. . . . We have been very fortunate in receiving lengthy letters from classmates who have not written for several years; next month, we shall continue with quotes from the experiences of **Frederick Rich** and **Ken Hamilton.** So keep the mails busy and remember the '13 notes are your responsibility.—**George P. Capen,** Secretary, and Treasurer, 60 Everett Street, Canton, Mass.

'14

The Minneapolis architectural and engineering partnership of McEnary and Kraft was recently expanded by four new

partners, one of whom is **Dale McEnary's** son, David. Dale and Kraft started the partnership in 1934, and Dale's practice has been broad in scope, recently including the new main public library and the Minneapolis Auditorium. . . . **Lyle (Doc) Richardson** has attracted considerable attention as the senior construction man in charge of the Technology Square complex. The first nine-story building has been completed and the second is already well underway. A 25-story building is planned for the future. Doc has been with only two companies in his almost 50 years in the business—the Aberthaw Construction Company and the Morgan C. Tuttle Company. He is project superintendent of Technology Square. While out walking a few days ago near the project, I noted Doc walking a short distance away, but in attempting to catch up with him, I lost ground and so gave it up. The reason why is well explained in an article I ran into a few days later: "During the course of construction of 545 Technology Square, a 10-story structure, it is fair to estimate that he made at least 1,000 trips from the ground to the top of the building on foot. He is frank to confess that he was not sorry to see work completed on the elevators in this building, but at the same time, as a 30-year member of the Appalachian Mountain Club, he says that the job left him fit for his favorite recreation of mountain climbing. At more than three score years and ten, Richardson can leave many younger men behind as he hustles from one end of the job to the other and from sub-basement to the very top floor . . . A vigorous hale and hearty man, he stands an erect 6 feet 2 inches. There is not even the slightest suggestion of bulge at the midriff and his trips up the floors of a job or over the scaffolding leave him un-winded. He is treated with affectionate respect by those who work with him. He is a modest man, but carries easily the authority that comes from living well and working hard and knowing his job down to the last detail."

Once in a while I see or hear from **Alden Waitt.** Each time he insists that I should not tell items about him to the class so frequently; but why should not the class know of how he keeps winning art awards, particularly as it has all developed since he retired? For the fifth time, he has just received the Landscape Award. And part of the award is real cash money!— **H. B. Richmond,** Secretary, 100 Memorial Drive, Cambridge 42, Mass.; **Charles P. Fiske,** President, Cold Spring Farm, Bath, Maine; **Herman A. Affel,** Assistant Secretary and Class Agent, R.F.D. #2, Oakland, Maine; **Ray P. Dinsmore,** 50th Reunion Chairman, 9 Overwood Road, Akron, Ohio.

'15

Happy New Year with the hope you and your families have all enjoyed a pleasant and comfortable holiday season. What a night! Why did it have to happen to us? On November 8, the steadily pouring rain and high gale winds damaged Boston with a severe storm resulting in the worst traffic tie-up in the city's history. It was terrible. Despite that, 20 brave classmates and true showed up for our Class Dinner at the M.I.T. Faculty Club. In the face of such miserable weather and driving this was a splendid tribute to the wonderful class spirit in 1915. Last minute cancellations from Bill Brackett, Wayne Bradley, Clive Lacy, Ben Neal (fogged in Buffalo), Al Sampson, Bill Sheils and Louie Young reduced our attendance to Sam Berke, Jack Dalton, Sam and Herbie Eisenberg, Whit Brown, David Hamburg, Jim Hoey, Azel Mack, Archie Morrison, Charlie Norton, The Pirate and Gerry Rooney, Chet Runels, Wally Pike, Jac Sindler, Frank Scully, Easty Weaver, Pop Wood, Fred Waters and Max. This is just about tops for Class Spirit! **Reggie Foster** was recovering from surgery in the Lowell General Hospital; we all signed and mailed a card to him with friendly wishes for a complete and speedy recovery. **Speed Swift** was not quite up to that long trip from New London. It was a pleasure to welcome this fine bunch of old friends and the younger members of the Class—David, Herbie, Gerry and Jim Hoey, President of '43. Regards came from many unable to attend: Herb Anderson, Larry Bailey, Jerry Coldwell, Larry Landers, Boots Malone, Doug MacMurtrie, Hank Marion, Harry Murphy, Stan Osborn and Bur Swain. It was good to have **Sam Berke** with us and to see **Frank Scully** looking and feeling so well. . . . **Larry Landers** has again set up our annual New York City Class dinner for Friday, January 17, 1964, at the Chemists' Club. This has become an outstanding and much looked for class party each year, and the big crowd planning to go down from Boston is expecting to see an even bigger crowd from Metropolitan New York. That work-horse, **Bur Swain,** will co-operate with Larry to make this another big success for 1915. Plan to be there with us to discuss first plans for our 50th Reunion.

Long distance competition at the Boston dinner created a tight race with Archie and Fred, Marblehead; Whit, Concord; Max, Framingham; Chet, the Lowell twin; Pop, Peterboro, N.H. (out of retirement); Charlie, who must have walked on the waters from Martha's Vineyard, and the WINNAH, **Sam Berke** from Lakeville, Conn. Sam described some of the amusing incidents that go with artificial insemination with his prize herd of 'Golden Guernsey' cows at his extensive Deep Lake Farm. There was a general discussion of plans for our 50th in June, 1965, but definite results will have to come out of another committee meeting early in 1964. The excitement of the evening was David **Hamburg's** generous check to Ben's 50th Fund, given in memory of his father, **Abe,** whom we all remember well. Bill **Sheils** plans to do the same thing later. These gifts were wholly unsolicited. Credit, praise and thanks from us all to these fine young sons of '15. Altogether, it was a successful and enthusiastic evening.

After the Faculty Club meeting a number of the fellows came over to our apartment for a pleasant and late visit with Fran and a little cognac. Very nice, all around. . . . I had a pleasant lunch and delightful visit with **Thayer MacBride,** President of Stetson Shoe Company, Weymouth, Mass. . . . **Pop Wood** sent us a colored print of a picture we took in his lovely garden in Peterboro, N.H., last summer. There I am posed in my best manner, between our two wives. Yet Pop captions it "Two good looking Dames, but what a character in the middle!" . . . **Ben Neal** invited us repeatedly for a visit at his summer place on Cushing's Island in Portland (Maine) harbor. The threat of September hurricanes scared us away and Ben classed us as "hothouse flowers"—ah, me, what abuse. . . . On August 3, **Henry Daley's** son, Robert Edward Daley was married to Maria Ann Rapp at Glenside, Pa.. Congratulations and good luck to this young couple. . . . **Norman Fowle,** Woburn, Mass. wrote: "I am hoping to stay alive for our 50th. I have two daughters and two sons married, and one son single, with three grandsons and seven grand daughters." A fine family, Norm. . . . **Otto Hilbert,** Corning, N.Y.: "I expect to have a business trip to Rio, San Paulo, Buenos Aires, and Southern Chile, early in 1964. We then plan to go from the west coast of South America to New Zealand, Australia and the South Sea islands, returning in time for the Rotary Convention in Toronto in June." From our experience in the South Pacific last summer, we know Helen and Otto should get some lovely and colorful pictures.

Rear Admiral **Bill Smith,** Mobile, Ala.: "I have finally 're-retired' from my job as vice-president and chief engineer of Palmer and Baker Engineers. I am selling my house here and plan to move back to Boston next spring. Mrs. Smith passed away last November, and as I have no children except a stepson in Delaware, I want to be nearer my sisters in Massachusetts. So I hope for once that I will be close enough to M.I.T. to participate in some of the fun for our 50th anniversary. After two years 'apprenticeship,' nearly 31 years in the Navy and over 15 years in this job, I feel that I have 'had' it. I don't know whether I will be able to stay retired this time—I even had a long distance offer today to go to New Zealand! I told 'em I had retired, 'period.' Please remember me to the boys, especially **Marshall Dalton** and **George Rooney.**" . . . **Mary Plummer Rice,** Mill Valley, Calif., to Ben Neal, with nice checks for class dues, Alumni Association and our 50th Fund: "It was a great pleasure to greet Fran and Azel out here last summer. My granddaughter Penny enjoyed the evening. Best wish to you all with hopes of seeing you in Boston in 1965." **Charlie Norton,** Chairman of the Martha's Vineyard Rat Control Commission, came in for praise for his very effective work, from the Federal Department of the Interior, Division of Fish and Wildlife. Nice work, Charlie. . . . **Vince** and Martin **Maconi** were impressed by the huge amount of shipping they saw on the St. Lawrence Waterway, while they were at the Thousand Island Club. After the winter in Florida, they plan a European trip to include Italy, Switzerland,

France and Denmark. What a hard life they have to suffer.

Late in October, **Bridge Casselman** was immobilized in his local hospital in Harrisonburg, Virginia, with a mild heart attack. When here for Alumni Day and the Class Cocktail party he looked and felt so well that this is a shock to us all, and we send him our friendly wishes for a speedy and complete recovery. . . . At the Annual Convention at the Statler Hilton Hotel, Boston, in October, of the American Association of Textile Chemists and Colorists, there were many M.I.T. men prominently present. Ernest R. Kaswell, '39, is national president. Members of the association from our own class are Alton Cook, John Dalton, Ralph Hart, Larry Landers, Phoebe Proctor, Al Sampson (former national treasurer) and myself. Many thanks, many blessings to you all for your "help Azel."—**Azel W. Mack,** Secretary, 100 Memorial Drive, Cambridge 42, Mass.

'16

We start the New Year with a bit about **Steve Brophy.** He surely carries his share. About a year ago he resumed the presidency of the American Heritage Foundation which is now carrying on an extensive effort to persuade citizens to register and vote in next year's election. (As we recall, Steve did the same in 1952.) And on September 26, dedication ceremonies were held for the Institute of Reconstructive Plastic Surgery at New York University Medical Center in New York. Steve made the presentation. This facility was made possible by the Society for the Rehabilitation of the Facially Disfigured, of which Steve is president. He says: "Over a term of years we were successful in raising more than two million dollars for building and equipment and $2,250,000 for research and training of specialists in reconstructive plastic surgery. All of this is more or less the outgrowth of the accident I had some 30 years ago." Steve is also serving as a consultant in connection with the development of the Federal Pavilion for the 1964 World's Fair. All of these things Steve does quietly but so effectively! . . . On Election Day, the name of **Leonard Best** was of importance in New Jersey. Leonard was chairman of "Citizens Opposed to the $750-Million State Bond Proposal"—a proposal that was roundly defeated. Much of the credit goes to Leonard and his committee and their very active program for getting out the vote and clarifying the issues! Congratulations to him! Since then, we are hearing his name on the radio about plans for financing educational and other needs.

Bob Wilson had a slight coronary late in October just before he and Pearl were to leave for White Sulphur Springs, West Va., where he, as Commissioner, U.S. Atomic Energy Commission, was to present an interesting and timely paper "Actual and Alleged A.E.C. Objectives in the Nuclear Power Field" before the Association of Edison Illuminating Companies. He was in the George Washington University Hospital for three weeks, then was "to be at home for two or three weeks" before resuming work. As of this writing (November 8) he is progressing nicely. We have surely been fortunate to have Bob in a position to influence, for over-all good, the policies of the A.E.C. for over five years. In his paper he restated the specific objectives included in the A.E.C. Report to the President in 1962, to wit: "The demonstration of economic nuclear power by assuring the construction of plants incorporating the presently most competitive reactor types; the early establishment of a self-sufficient and growing nuclear power industry that will assume an increasing share of the development costs; the development of improved converter, and later, breeder reactors to convert the fertile isotopes to fissionable ones, thus making available the full potential of the nuclear fuels; and the maintenance of U.S. technological leadership in the world by means of a vigorous domestic nuclear power program and appropriate co-operation with our friends abroad."

Gene and Di **Lucas** are enjoying their "new little house" in Watertown, Conn., where Gene's green thumb has been getting the lawns and gardens "on an organic basis." Summer was a busy time with a week in Watch Hill, two conferences (in Massachusetts and Pennsylvania) for which they were delegates for Trinity Episcopal Church in Waterbury, and two weeks at their old stamping ground in Canton, Maine. Daughter Diana, with the Educational Testing Service in Princeton, is co-ordinator for publications. She has just been given an award by "Recordings for the Blind" for five years of continuous readings. We are glad to record that the Lucases are from-now-on reunionists. And speaking of reunions, **Cy** and Gyps **Guething** liked it so well at the Oyster Harbors Club, where we held the 47th, that they plan to return there on their own for a couple of weeks next August. . . . **Duke Wellington** has returned to White Plains after his summer at Littlejohn Island in Maine where they have two cottages. Just what he is going "to do this winter to keep out of trouble" has not been decided yet. He says they are still talking about the wonderful time they had last winter visiting the **Stew Rowletts** in Clearwater. They had not called on the **Emory Kemps** because he could not reach Emory on the phone: "maybe he was fishing every time I called; I didn't know they fished at night." . . . **Jack Burbank** writes from the Cape: "nine holes of golf every pleasant morning—scores still 41 to 47—plenty of friends to play with at the Wianno Club." He had been down East for a few days to "help close" the Migis Lodge in South Casco, Maine. "Wonderful food, good friends—poor fishing—or rather good fishing but no fish." He enclosed a clipping of the **Steve Whitney** Watertown home, a story about moving and preserving this old landmark, a place to which Steve invited many a '16er in days gone by. Incidentally, the **Dave Pattens** see Steve Whitney's daughter, Pamela, often since she and her husband are friends of Dave's children; they all went to watch Dartmouth take on Harvard. At about the same time, **Phil Baker** sent us a clipping from a Detroit paper, "The Whitney Home on Woodward Avenue—House of Solid Pink Granite." The same ancestral family, mused Phil, from Watertown way back.

The **Joe Barkers** saw a grandson graduate from Exeter in June, then visited son John in Idaho where he is a captain in the Air Force in command of a "hardened unit" of ICBM's. Joe describes this below-ground on-constant-alert unit, crammed with equipment, as "some installation!" During the summer, Joe and Mary and son Michael contributed personal labor to a project at their home in New Rochelle—an outdoor terrace (25 x 30 feet) involving excavation of 37 yards of dirt and boulders, toting the dirt away by truck (did you ever see Joe or Mary drive a truck?) and carting some 6,000 bricks from an old building being razed in an "urban renewal" project. Some time next spring or summer, they say, "we will have the brick paving done and a translucent roof over the terrace constructed. We are developing into pretty good masons and carpenters." Joe continues part time as consultant to NASA and to BEMA's data processing group.

As for our continued story of **Vertrees** and Sylvia **Young's** safari and rock-hunting trip, we quote this time a message from Vertrees himself about the Premier Diamond Mine in Transvaal, Union of South Africa: "Sixty million years ago, geologists tell us, the land surface of this part of Africa was possibly three or four thousand feet higher than at present, or stated differently, rocks presently exposed were then covered by three to four thousand feet of other sediments and lava flows. There occurred about that time in several parts of South Africa a peculiar type of volcanic eruption. Lava was not poured forth, but a succession of subterranean explosions drilled enormous holes in the earth's crust. These holes were filled with kimberlite, or 'blue ground,' material brought up from deep within the earth and containing rock types like eclogite and olivene not ordinarily encountered near the earth's surface. The holes or 'pipes' thus drilled from below are of unknown depth, generally circular to oval in shape and varying in size from 50 feet in diameter to as much as a mile. The one now operated as the Perimeter Diamond Mine is 2,800 feet long and about 1,400 feet at its widest point. In it in 1905, the famous Cullinan Diamond was discovered—weighing 3106 carats—nearly 1½ pounds. At the beginning, the blue ground containing the diamonds was dug out and hauled to the surface in an open pit operation. Later, a shaft was sunk through the solid rock 300 feet or more from the edge of the pipe and horizontal tunnels driven into the pipe. . . . Today 16,000 tons of blue ground are hoisted daily. In the year 1959 alone, 1,272,720 carats of diamonds were recovered from this pipe, but only about 20 per cent were of gem quality. The process of recovering the comparatively minute amount of diamonds from such a mass of rock is too complicated to describe in detail. Briefly, the rock is

crushed and screened and then two properties of diamonds are made use of to separate the diamonds. One is that diamonds are heavier than rock, so the mixture of diamonds and rocks is passed through a carefully controlled mixture of water and ferrosilicon, heavier than rock, but lighter than diamonds, so that the rock floats (or most of it does) and the diamonds sink. This concentrates the diamonds but there is still some rock present, so the mixture is then flowed over sloping tables coated with grease. Water will not wet a diamond, so the diamonds stick to the grease and the wet rock fragments slide on over and are discarded. The grease is then scraped off the tables and melted and the diamonds are screened out. Sounds simple, but it takes a lot of doing and a tremendous investment." (Continued next month!)

Jap Carr tells of a surprise visit in October from the **Steve Brophys** in Buck Hill Falls, Pa. The Carrs started back to winter quarters in Palm Beach on November 11, with a stop-over at Sea Island where there was a Fall Tennis Tournament for Junior Veterans: "They have to be over 35 so you see I just barely quality," says Jap. He notes that his Palm Beach address is 260 Pendleton Avenue, where there is a welcome for '16ers. . . . **Jim Evans** and his correspondence brought in a number of items. He talked to **Brad Curtis** late in October. Brad had a coronary but is on the mend. . . . Ruthie **Gordon** writes that she and **Barney** were sorry to miss the reunion and hope to make it next year. . . . **Will Wylde** wrote Jim that he and his wife were leaving for Indianapolis in mid-October to visit their son and family. . . . **Francis Stern** returned from Europe just too late to attend the October 1916 New York luncheon at the Chemists' Club. (Incidentally, these 1916 monthly luncheons have been continued but are now held in the Chemists' Club, 52 East 41st Street, the Thursday following the first Monday of each month, and so far jointly with '17 in a private dining room on the second floor.) Jim saw **Ralph** and Sibyl **Fletcher** off on their October flight from Idlewild Airport to London to Madrid where Ralph went hunting for grouse, "without a crutch" (crutches had been his prime nuisance since he broke his ankle skiing last March). We hear he was to go duck hunting in Canada on his way home. . . . **Peb Stone,** commenting on a Ferd'nand cartoon in which a missile had gone up through a roof, was reminded of bat hunting at his summer home on Little Beaver Island in Winnepesaukee: "I discovered a bat inside the ridge pole of the boathouse. I got my trusty .410 shot gun loaded with #9 shot (tiny pellets) which shouldn't go through cardboard (I thought) and I blew the bat clean through the roof—subsequent experimentation proved that .22 calibre shot shells are adequate for the purpose."

Now for one of our difficult tasks—that of deciding which segments of **Irv McDaniel**'s letters to include. This time, letters come from in and around Greece. Driving from Bulgaria, after seeing Mt. Olympus "piercing the sky and overwhelming all other mountains," he writes: "Next morning we passed the Spring of Daphne and then came the Spring of Venus, the spring of Eternal Love. Katherine and I knew our love was eternal but we drank anyway. Next day we found out to have eternal love, you bathe in it, you don't drink it. But it was too late. Next came the Valley of Tempe, a deep gash 150 feet wide and 10 miles long caused by an earthquake and the only access into Thessaly. They have gentle winds known as 'zephyrs' [the name of my pussy-cat; Sec.]. We had the finest white figs there we have ever eaten. At Larissa, we turned off to Kalambaka and Meteora. Meteora is one of the Seven Natural Wonders of the World. A large number of precipitous rocks, some as high as 2,000 feet, are literally suspended in mid-air (that is what meteora means). On top of 23 of these pinnacles are Greek Orthodox monasteries. The Greek monasteries were started by Athanasius in 969 A.D. when he founded the Great Lavra near Mt. Athos (which is on a peninsula south-east of Saloniki). He had many rules, one being the Studite Rule, which forbids all women and all female animals including hens [from entering the monastery]. In over 1,000 years, this rule has only been broken twice. In the 11th Century, Greek shepherds were renting their wives and daughters to the monks. In the Mt. Athos area there are no roads and each monastery is a world in itself, a way of life, a state of mind. On Athos there are many monks who haven't seen a woman for 50 years and have never seen an automobile. These monasteries have managed to survive for over 1,000 years, and they are the last theocracy on earth, since the fall of Tibet. We must respect them as sanctuaries of peace. At Meteora women are now permitted at a few places under conditions. Originally, the only access was by a pulley basket operated by the monks on top. Today some have carved steps out of the rock but the ascent and descent is difficult. If you are timid, you can motor over paved roads to adjacent peaks and get a good view of it all and watch them still pulling up the baskets. At Meteora, the monastery buildings are on the Athos pattern with early Christian mosaics, Byzantine frescoes, ornamental brick work—all of it is decadent. Their chapels are heavily ornamented with gold, silver, and lapis lazuli. Their icons are famous. Many of the high rocks have caves up the sides and monks have walled themselves inside. Once a week they lower a basket for food and water. When the basket ceases to be lowered they know the monk is dead. These caves have unearthed many Neolithic settlements (circa 3,000 B.C.), and Homer wrote myths about this area. We saw a few monks but none of them looked saintly to me. They seemed more like peasants—shy, but sincere. The shattering impression caused by these rocks is terrific. Windswept—awe-inspiring—these monasteries on the edge of a precipice— an abyss." More next month!

Stewart Keith gives a plug for Denver as a place for retirement: "This city leads the nation in the number of non-profit housings for the independent (healthy) aging—19 such places. Also the weather is very enjoyable 360 days a year." He says he judges, from the picture of the 47th reunion, he missed a chance to meet 38 enjoyable people, but that he and his wife will be at the 50-year reunions (Wellesley, M.I.T.) if they possibly can. . . . **Dave Patten** said the fall foliage beckoned in early October "and we took a quickie two-day tour of the White Mountains. Actually the weeds around my place in Duxbury and the pond are more colorful." Then: "Old friends seem to be popping up, from far-away places. My former New Guinea roommate, Colonel Harold Oxley from Melbourne, Australia, stopped by on a trip around the world and two of my old GHQ staff members in New York called a few weeks ago. Sunday we went to a C/T party and found one of my CNO Staff members there. Small world!" . . . **Ed Weissbach,** Rector of Christ (Episcopal) Church in Somerville, says he must definitely give up this work in March. Says he has put his house in Merchantville, N.J., in the hands of a realtor and finds real estate much more expensive in Massachusetts. They plan to settle in the vicinity of Boston, as Elizabeth plans to teach a little longer at Winsor School. Ed is developing "a hobby of investigating history, railroads, and genealogy." They plan to take a trip to Europe late in June and to return in September. They have been enthusiastic over some of Irv McDaniel's and Sylvia Young's colorful accounts of Austria and Germany. Ed also told of their Rambler breaking down in the middle of Harvard Bridge in the densest morning traffic—ask him about it.

We have had word from **Merrick Monroe** of Darien, who is presently chief, Technical Services Section, in the New York Office of the Small Business Administration. For many years, he was "in sales and marketing of petroleum products dispensing equipment." The Merricks have one son, a junior in Pomona College, Claremont, Calif. . . . Elouise **Berke** reports that daughter Louise, who attended our 42nd Reunion with Elouise and Steve in 1958, has just been married "in a darling Episcopal Church" in Sausalito, Calif., to "a fine young chemical engineer with Standard of California." . . . **Obie Pyle**'s comment on the 47th reunion picture: "You certainly were a very handsome and distinguished group. I bet **Dan Comiskey** still has that happy glint in his eye. Wish we could have been with you." The Pyles are welcome visitors of ours on our seashore (Long Beach Island) summer vacations; they missed last summer, but vow not to miss in 1964! . . . **Don Webster,** with a new postal address (446 Davisville Road, East Falmouth) says that they had fringes of Hurricane Ginny on October 29 but no damage. . . . Concise and sharp, that's how **Theron Curtis** handles suggested topics. Examples: What you've been doing? "Nothing" Where you've been? "No where" What the grandchildren are doing? "Growing up" A bit of philosophy? "Vote for Goldwater!"

Arvin Page says he may have to serve merely as a pinch hitter on the 19th hole

at the 50th in 1966. Says: "I feel certain I will be able to handle that assignment." His activities since May have consisted almost 100 per cent of a fight with arthritis. "It hit me without warning. For the first month it migrated from joint to joint staying in each place about 24 to 36 hours. I even had it in both hinges of my jaw at different times. Then it settled down for a long siege in both hands, wrists, elbows, shoulders, and knees. My campaign has produced some good results but so far I have been unable to rout the enemy." . . . The **Charlie McCarthy**s took off on November 1 for Athens for several weeks. The Flight Safety Foundation of which he is president is holding its annual International Air Safety Seminar there the week of November 3. They expect to have about 150 delegates from some 20 countries. Charlie says: "Hopefully all or most of them will be able to speak English." . . . **Dick Berger** continues active as head of Cancer Prevention, Inc. The August 1963 issue of Sunshine Magazine says he "warned of the carcinogenic character of tobacco tars in 1937, 10 years before public health groups began to publicize this hazard. Another common cause pinpointed by Mr. Berger as inadequately emphasized, is the potential danger of x-rays." With this clipping we have a good picture of Dick to put up on the bulletin board at the next reunion.

From the circulation of one of Irv McDaniel's letters we have more comments. From Obie Pyle: "As interesting and exciting as the previous one. I certainly envy this lad." Stew Rowlett: "Keep these letters coming!" Bill Leach: "Send more." Dave Patten: "Took Irv's letter with me to read to members of the family in Chestnut Hill—it is too good not to share, especially with those who have done a bit of traveling." . . . And here are comments on a Sylvia Young letter, re. the Young Safari in Africa. From Jap Carr: "I spent Halloween reading this to Hildegarde—both enjoyed it immensely —compliments to Sylvia." Theron Curtis: "Very interesting." Francis Stern: "I'm exhausted just reading about it—but it must have been really tremendous." The Bob Wilsons: "Very interesting reading—Mrs. Young writes well and holds your attention."

Now the column closes with best wishes from your officers for a happy, healthy, and prosperous New Year. Thanks to those who respond promptly to requests for information to help fill the little old class column with news and comments. Should you know of instances of '16er-illness where a get-well card would help a little, just let your president or secretary, or Jim Evans know (25-31 Fair Lawn Avenue, Fair Lawn, N.J.). Jim, of our Good Cheer Division, has a supply of printed notice cards, furnished by Steve Brophy, to advise others that a get-well card might help.—**Harold F. Dodge,** Secretary; 96 Briarcliff Road, Mountain Lakes, N.J.; **Ralph A. Fletcher,** President, P.O. Box 71, West Chelmsford, Mass.; **Joseph W. Barker,** Vice-president, 45 Beechmont Drive, New Rochelle, N.Y.; **Hovey T. Freeman,** Treasurer, 45 Hazard Avenue, Providence, R.I.

'17

Happy New Year, whether you dwell in the cold northern part of the U.S.A., with outside activities reduced to a minimum, or in Florida, Southern California, Arizona, or other warm climates enjoying sunshine and out-of-door exercise. This issue of the class notes includes news items received in response to the mimeographed request for vacation news sent out in mid-October. If you enjoy reading these, why not act on a New Year's resolution and send yours along? The following are reported in the order received, the first from **Walt Whitman:** "We had not realized the joys of a pensioner until I retired from the State Department late in 1962. After a few months to quiet down, we packed two bags and headed for Greece and the Aegean islands, with little money but lots of time, and an urge to see other peoples and their ways. We shunned the planned tours—they are for tourists who have to hurry—and the hotels with reputations. In mid-February it's much too cold in Greece, so we lingered a bit in Madeira, and then moved leisurely through Lisbon, Spain and Sicily to Athens, arriving in Rhodes in plenty of time for the Easter season. After six wonderful weeks with alphas, betas, phis, omegas and oranges, we flew to Yugoslavia for a fascinating and most economical week (Belgrade and Dubrovnik), sailed up the Adriatic to Venice, and then joined another couple for six weeks by rented car through northern Italy, all around Austria, and down to the Mediterranean coast of France. It was most reassuring to find that we could cope with local transport, climb ruins, talk with our hands, and drink native firewater—albeit at a pace befitting our years. We will shortly drive West to try a winter in Arizona, with the special attraction that three of our seven grandchildren live in Scottsdale. The other four live just across the Potomac in Virginia, only 20 minutes from our home in Washington. Our third child and his bride are just now sailing to Paris for two years of 'art and culture' on the Left Bank, so our new career of retirement may well take us overseas again."

Hear now from **Irving Fineman:** "I feel rather detached from my M.I.T. classmates since 1930, when I gave up the practice and teaching of engineering to engage in my present career of writing; however, it has not detached me entirely from my earlier scientific interest, as witness my novel, 'Doctor Addams,' about a biophysicist. It is available in most libraries and might interest those of my classmates who may be curious about how well technological training prepares one for the art of writing. I recall how, when I first arrived at Tech and was questioned by Professor Rogers about my reading, he decided that I had read enough for an engineer and excused me from his courses, which were practically the only humanities offered at M.I.T. in those benighted days; so, it took me over a decade to discover that my literary talent was greater than my engineering talent—although I enjoyed that too; and I have in the works another novel about a scientist. As for my travels, my home place in the Green Mountains of Vermont is so delightful in the spring, summer, and fall, that I rarely want to go anywhere else. To escape the rigors of winter, I usually go abroad or to California (where I used to write for the films from time to time). Last year Warner Bros. made one of my early novels 'Lovers Must Learn' into a picture they called 'Rome Adventure' (not as good as the book, of course). I think I have compensated for my defection from engineering through my two sons: Joe teaches physics and does research at Caltech; and Jon is an electronics expert (fire control) in the Navy." . . . **Richard W. (Dick) Logan** is next: "I retired from Charles T. Main Inc., Boston, in January, 1963, having completed over 44 years with that organization. At the time of my retirement, I was treasurer of the corporation and one of the directors. Since January, I have been spending my time in setting my affairs in order to meet new economic conditions (less money than when I worked) and doing a little running around with my wife. We have been to Bermuda, New York, Cape Cod, Maine and New Hampshire these past months and now are back at home where we are going to work again as joint chairmen of the mixed curling group at Winchester Country Club. This is more of a job than it sounds like, but we both have curled for several years and believe it to be the most enjoyable winter sport and shall enjoy the work. In Maine we met **Pete Newell** and his charming wife and enjoyed visiting with them. Pete is also retired from his Florida activities. We have two grandsons who are active youngsters and they and their parents keep things moving when we exchange visits. Our life at this time is a most welcome change from the former rat race."

William D. Canan writes: "Mrs. Canan and I had a very enjoyable and interesting vacation. With two friends, we left Hagerstown by auto January 25, 1963, and spent about five weeks in Mexico—five days in Mexico City, three days in Acapulco, and the remainder of the time in Taxco, Ixtapan, Cuernavaca, Guadalajara and others. After leaving Mexico, about March 1, we drove to Tucson, Ariz., where we stayed at a ranch until March 9. We arrived back in Hagerstown March 15. During the entire trip of 50 days, the weather was ideal; not a single day of rain or uncomfortable high or low temperatures." . . . **Josh Whetzel**'s comments are: "During early July I fished in Canada with Canadian tin plate and can friends. Later in July I flew to London with my good wife, discussed business matters again with tin plate, can, and canning friends, after which my wife and I made a grand tour of the continent, also meeting many business friends in France, Belgium, Germany and Italy." . . . **Bill Neuberg** informs us that: "Last month I was in California and went up in a glider plane with my son, who resigned as a lieutenant in the Ferry Command of the U.S. Navy. It was the most relaxing experience that I've had in a

long time. I also sailed out of Sausalito in a Triton over San Francisco Bay. To top it off, I rode up to about 6,000 feet high on horseback in the Sierras." . . . **J. J. Storrow** "cruised the coast of Maine for the 27th successive year in July. I finally retired, but I am kept from stagnating by membership on four or five committees, mostly concerned with conservation."

The news from **Dick Loengard** states: "Our travel has been limited to flying to Sandy Lane in Barbados for several weeks in the Caribbean. Last February and March it was an extremely pleasant way to break the routine of a New York winter, even though we normally spend each weekend at our house in East Norwalk, Conn. I don't count the several trips I take to Canada as a director of United Funds of Canada as recreation even though they are fun and interesting. Our younger son was married to Eleanor Sturgis in Beverly Farms in August, which was an extremely happy occasion. This event, the Sturbridge Reunion, and friends in the Adirondacks and elsewhere, paved the way for a substantial amount of motoring which my wife and I both enjoy. About my golf game, the less said the better, unless I am destined to shoot my age, in which case I shall have to live a very long time." . . . From the office of Mayor (**Joyce R. Kelly**) of Richland, Wash., comes the following: "First, briefly, let me cover personal matters. We have lived for more than 15 years in this house overlooking the Columbia, a pistol shot away. This is near the upper end of the lake formed by McNary Dam, some 40 miles down river. The ever-changing kaleidoscope of sun and wind and weather on the surface of the mighty Columbia make a scene of rare and ever-changing beauty. We have two sons, the older, a freshman at Pacific University, Forest Grove, Ore., with honors at entrance. He seems headed for biology. The younger is in high school, and we have hopes that he may be the engineer in the family. . . . Some seven years ago, I retired from General Electric Company after substantial responsibilities for the design and construction of three reactors and their associated water treatment plants. Since then, my avocation has been, in part, politics. Under a law passed by Congress in 1955, all residential and commercial property in this city was to be sold by the Atomic Energy Commission, and the city was to form its own municipal government. I was one of 15 freeholders elected to draw the charter, and became chairman of the commission. The city was incorporated in December, 1958, and I became a member of the seven-man council. We have the council-manager form of government and a population of 25,000, the ninth city in the state. Since 1960, I have been chairman of the council and mayor. Our chief municipal problem is to attract commerce and industry to provide a broader tax base when the need for plutonium tapers off. Until 1969, the A.E.C. is empowered by law to provide 'just and reasonable assistance financially.' Currently these assistance payments have been cut in half —now are about $250,000 per year. . . . A recent event which should prove interesting to my engineering classmates was the dedication of the first dual-purpose reactor in the world. This reactor is designed to irradiate uranium and produce plutonium and utilize the heat from the cooling water, formerly wasted, to supply turbo-generators, thus adding about 800,000 kilowatts to the Northwest Power Pool grid. The steam supplied will be at about 500 psi, a very low pressure these days. The reactor and accompanying facilities are nearing completion, but the generating equipment will not be operable for two or three years. Some part of this delay was due to violent opposition in Congress, particularly from the coal-producing states. . . . At the dedication ceremonies, at which President Kennedy and entourage were present, the Hanford exclusion areas were open to the public for the first time in the area's 20-year history. Some 35,000 people were present. My guess is that a considerable number from near and far came as much to see the mysterious plant buildings as to hear the president. Perhaps the V.I.P.'s also learned some geography, since one asked the name of the river to be seen nearby. . . . My classmates would be interested in visiting this great Northwest country, free from the mad scramble and congestion of the Atlantic Seaboard. To any such, I extend a cordial welcome." . . . A natural sequence of letters provides one from **Leslie R. Groves,** who was so intimately connected with atomic power. He writes: "In the last few days of 1962, I drove to Houston, Texas, to see my daughter and two grandchildren. Throughways are fine if you are in a hurry, otherwise, I think the engineers of today have taken all the joy out of motoring. Maybe they are too scientific. In June, my wife and I went to Europe for a month, the purpose being to see the German area where my son was stationed near Wiesbaden. He commanded a battalion of Engineers. Then we went to Switzerland for a week at Villars where our two oldest granddaughters were in school; then another two weeks in Switzerland and Munich plus a stopover of a day in Lichtenstein, one of those tiny European countries. After a couple of days in Paris inspecting things of interest, we came home on the most placid Atlantic I have ever seen. We have been very quiet since then, although I find I am just about as busy as I ever have been."

Now a note from **Warren Tapley:** "We were in Florida last winter at Singer Island, across Lake Worth from Riviera Beach. I played a lot of golf, consumed good food and drink, and kept healthy. We do just about the same on the Cape, with a visit to our daughter in Connecticut four or five times a year. We can take the latter for a few days at a time, but with three grandchildren it is pretty hectic. I suppose at our age, one's activities are about the same. It's awfully easy to fall asleep in your chair, and really a chore to percolate socially. Falmouth is a very social place, so we do have to get out occasionally. One item of importance since the last report was a prostate operation, and another a nice set of uppers." . . . The following is from **Tharratt G. Best:** "Although retired, I still serve as chairman of the board of a small national bank, act as pseudo-engineering consultant to the town (Boonville, N.Y.) and others, prepare tax maps for them, and concern myself with management of estates. My waking hours are as full as ever, even at 71. My hobbies include reforestation and local history, with three books to my credit, and another in process, all dealing with local history. I also do a little miscellaneous and usually abortive fishing, play careless and unsuccessful golf, and do considerable traveling, including winters in Florida. Last year my wife and I took our eight-year old grandson to the Seattle Fair via Wisconsin and western Canada, and returned by Portland, San Francisco, Lake Tahoe, Salt Lake City and Denver, my birthplace. This past summer we traveled 3,000 miles through Northern New England, Nova Scotia and on to Newfoundland which is all its name implies. It is a land of wonderful lakes and rivers, impressive mountains, and a great expanse of forests. Even if a bit strenuous at times for an oldster, life has become busier, more intriguing and most beguiling."

John M. DeBell was a member of a paper industry panel last summer which discussed the subject "Retrieval of Information on Technical Developments in Europe." . . . The monthly luncheon of the class members in the New York area continues to gather in classmates from different parts of the country as guests at the new luncheon headquarters of Tech Club of New York at the Chemists Club, 50 East 41st Street on Thursday of the first full week of each month. . . . When you visit your doctor's office, note the following: "There's one sure way of telling whether your doctor is modern or old-fashioned. Walk into his office and see if he subscribes to National Geographic or Playboy."—**W. I. McNeill** Secretary, 107 Wood Pond Road, West Hartford, Conn.; **C. D. Proctor,** Assistant Secretary, P.O. Box 336, Lincoln Park, N.J.

'18

When the fire alarm rings for class notes, there's a wide variety of apparatus which responds. Nothing much can be accomplished, however, in the tense and hope-filled moments following the discovery of a blaze, until the pumper arrives and hooks onto a hydrant. We have been reminded many times that **Bill Foster,** speaking reasonably, quietly, and yet with steady discipline, has pumped much cooling water at pretty constant pressure onto the combustible materials of international relations. And again, the pumper takes an important place in Washington social protocol where the President is number 1. The suedebacked "Social List of Washington, D.C.," arranging hundreds of names in the descending order of importance, (price $17.50 per copy) places our Bill as number nineteen. This is two ahead of the secretary of the United Nations, 15 ahead of the Atomic Energy Commission, and way ahead of the senators whose

hoses spout so many elegant phrases. . . . Behind the fire apparatus there has to be a fire commissioner, and behind him a sewer and water commissioner. Otherwise, there wouldn't be any hydrant to hook onto. So last fall the town of Braintree appointed **A. Winton Caird** to fill a vacancy on its sewer commission. Win has lived in Braintree since 1929, where he has served as a town meeting member, on the Planning Board for seven years, and in 1958 as a member of the Sewer Commission.

In addition to the firemen and the police, there will always be photographers hungrily searching for angle shots. These are made possible by a constant struggle to improve the science of optics. Our own **Arthur Hardy,** now professor emeritus of optics and photography, after 41 years of teaching at M.I.T., has been named to receive the 1963 Progress Medal Award of the Society of Motion Picture and Television Engineers. The award, which recognizes outstanding technical contributions to the progress of motion-picture and television engineering, was announced August 22. Formal presentation of the Progress Medal was made during the society's semi-annual Technical Conference in Boston last October. Hardy is probably best known for his pioneer work in motion-picture sound recording during the mid-1920's and for his later work on the theory of color reproduction in photography, television, and the graphic arts. He is the co-author of "The Principles of Optics," a standard reference in the field. During World War I, Hardy enlisted in the Photographic Branch of the Signal Corps, but was later transferred to the newly formed Air Service, and served in France as commanding officer of the 23rd Photographic Section. After the war he became an instructor at M.I.T. until 1920, when he accepted a position in the Research Laboratories of Eastman Kodak Company. He returned to M.I.T. as an assistant professor in 1922, and was made professor of optics and photography in 1933. During World War II Hardy was a section chief in the Office of Scientific Research and Development. In recognition of the work that he did in directing numerous research activities, he was awarded a Certificate of Merit by the President of the United States. In 1938 St. Lawrence University conferred upon him an honorary degree of doctor of science. The following year he received the Longstreth Medal of the Franklin Institute, which cited his invention of the recording spectrophotometer. He won the Modern Pioneer Award of the National Association of Manufacturers in 1940 and the Frederic Ives Medal of the Optical Society of America in 1957.

Following a fire there are always newspaper reports. For those in the know, reading them is often something of a shattering experience because the story shows so little concern for the claims of exact truth. Here, again, we have TIME magazine for October 18 giving our class credit for including Elizabeth Coit, '19, who is principal project planner for the New York City Housing Authority. This, we take it, is an outfit which doesn't wait for a fire in order to make plans for rebuilding. . . . Finally, the philosophers say there is no ultimate reality in merely owning something, despite which, many a conflagration finds the ensuing struggle against sorrow and loss considerably mitigated by insurance. However, it was not fire insurance here, as much as fire insurance for the hereafter, which interested **Wally Ross** in our well being. He long since retired from his labors at the T.C.A. A recent letter from him enclosed a particularly nice photograph in which he stands before the door of the Student Christian Movement in New England, where he has devoted his unselfish efforts. . . . **Donald Clark**'s widow notified us from Belfast, Maine, that he died on June 6. . . . And now your secretary can wait until the alarm rings again.—**F. Alexander Magoun,** Secretary, Jaffrey, N.H.

'20

It was pleasant to see **Al Burke** and **Pete Ryer** at the first Alumni Council meeting of the new season, both looking fresh and fit. Al still maintains his enthusiasm for tennis and plays at Longwood regularly. He was much in evidence there during the National Doubles, not as a player but as the man in charge of communications. . . . **Chuck Reed** has retired. A news bulletin issued by P.P.G. management says: "After a highly successful career of 42 years with Forbes Finishes Division, Pittsburgh Plate Glass Company (and its predecessor company), Charles H. Reed, General Manager of Forbes since 1947, retired on October 31." Chuck joined the company in 1921 and served as sales manager, technical director, treasurer, vice-president and general manager. He was president of Forbes Varnish from 1936 to 1947, when PPG acquired the business. All of us are wishing you many happy, healthy years, Chuck. . . . **Bob Bradley** holds forth at Tree Tops Farm, his handsome estate in South Dartmouth, Mass. . . . **Herb Fales** may be reached at 520 East 86th Street, New York City. . . . Don't lose touch just because you have moved to Florida or elsewhere. Let us hear from you!—**Harold Bugbee,** Secretary, 21 Everell Road, Winchester, Mass.

'21

Happy New Year! By this time, you have probably received a Class of 1921 letter to bring you up to date regarding preliminary plans for our next reunions and to ask you to state your opinions and choices, particularly with respect to another interim reunion this spring or in the spring of 1965, similar to our previous ones in Havana in 1958 and in Mexico City in 1960. Please answer the questions at the bottom of the letter and return the coupon to **Edouard N. Dubé,** 120 Tremont Street, Boston 8, Mass., as soon as you read this, if you have not already done so. Our next quinquennial reunion is the 45th in June 1966. Reunion Chairman **Mel Jenney** has established a preliminary choice of the site as the Mountain View House, Whitefield, N. H., a beautiful spot about 180 miles from Cambridge and an easy drive for getting "back to Tech" for Alumni Day. Between now and then, 1921 will get together, as usual, at the Alumni Day functions this year and next, but an interim reunion, if any, is wholly up to your vote. Please make your views known at once. Chick Dubé, who has graciously agreed to head the interim reunion activity, is an old hand at the game. He and Maida spent many hours laboring over the countless details of the most enjoyable jaunt to Mexico. Seasoned travelers themselves, this couple returned from a European trip last fall, after spending much of their time in Italy. They are still celebrating the arrival last year of another grandchild, a boy, to their youngest daughter, Caroline. . . . In his capacity as Honorary Secretary of M.I.T. and Regional Chairman of the Long Island area, **Irv Jakobson** represented the Institute in the formal inauguration last October of Dr. Dumont F. Kenny as the second president of Queensborough Community College of Bayside, N.Y. Jake has been in correspondence with **Helier Rodríguez,** now of Madrid, Spain, regarding the possibility of an interim reunion there, as mentioned in the class letter. Helier deserves well-earned credit for his usual most thorough job in covering all of the pros and cons of a trip to Spain. Jake is also to be thanked for his considerable help to us in reporting the Alumni Day events for our notes last month.

Herbert De Staebler, writer of life-saving notes, as reported earlier in these columns, says: "Any interest developing in another 1921 reunion like Cuba and Mexico?" The answer, Herb, will now depend upon the replies to the recent class letter. He continues: "I have taken early retirement and shall leave as soon as I get the various details cleaned up. Feel much relieved already. Dr. Herbert De Staebler, Jr., is designing the two-mile long linear accelerator at Stanford. My daughter, Jeanne, is going to Tripoli for three years and I expect to spend Christmas there. Her husband will be making movies for the U. S. Information Agency. Stephen has just been chosen as one of 10 American sculptors to represent the United States in the Biannele de Paris." No doubt your mail for Herb will be forwarded to him if you address it to 740 North Duke Street, Lancaster, Pa. . . . Through the kindness of his wife, Bertha, we have a letter from **Robert S. Cook** of Canandaigua, N.Y., and Ft. Lauderdale, Fla., written at Massachusetts General Hospital, Boston. Bob says: "This is to let you know that I decided to have my hips operated on to relieve my arthritis. I am now well on my way to recovery. The operations were accomplished during October and I expect to be out of traction about November 1. I will be here until Christmas, at least, since I have to learn to use crutches." Bob will certainly enjoy letters addressed to Room 709, Phillips House, M.G.H.

Munroe C. Hawes, of the real estate and insurance firm of Hawes and McAfee, Manasquan, N.J., won a handsome golf jacket as the first prize in the Class B competition of the New Jersey Senior Golf Association at Baltusrol. Munnie and son George, who attends Lehigh, were last reported duck hunting in the Carolinas. . . . **Arthur A. Turner,** General Manager of the Refractories and Electronics Division of the Carborundum Company, has been elected a vice-president. Art, whose headquarters will be at Niagara Falls, N.Y., is responsible for manufacturing and sales activities of the division's four plants in Perth Amboy, N.J., Latrobe, Pa., and Niagara Falls. Art joined Carborundum in 1932 as technical assistant sales manager of the Perth Amboy refractories division. In 1957 he became sales manager for all refractory product lines. He was made general sales manager of the enlarged division in 1961 and then was advanced to general manager. He is a director of the Harbison-Carborundum Company and his memberships include the American Rocket Society, the American Ceramic Society and the Ceramic Society of New Jersey. . . . Dean **Samuel H. Miller** of the Harvard Divinity School is quoted extensively in an article entitled "Morality U.S.A.," which appeared in the September 24, 1963, issue of "Look Magazine."

A welcome note from **Ed** and Helen **Farrand,** written in his native New Hampshire, was recently supplemented by a long distance telephone call from their home at Kinchafoonee Lodge, Leesburg, Ga., inquiring as to the progress of your secretary's health, following our recent automobile mishap. Ed attended the Alumni Fund Conference with Ray St. Laurent, Joe Wenick, Sumner Hayward, Larc Randall and Mich Bawden. He reported that **Leon** and Emma **Lloyd** had stopped at Leesburg on the occasion of a visit to their daughter, who lives nearby. The Lloyds were on their way to Miami and Nassau. **Ray** and Helen **St. Laurent** also phoned just before leaving their Manchester, Conn., home for a trip to visit Helen's brother in Nova Scotia. **George A. Chutter** wrote a cheery letter and says he, too, uses seat belts. George was among those who attended the first Alumni Seminar at M.I.T., and he says it was a wonderful experience. **Ralph Wetsten** sent good wishes for a speedy recovery and wrote that he knew something out of the ordinary had happened the moment he laid eyes on the unusually brief November '21 Class News. **John J. Healy, Jr.,** wrote from Monsanto headquarters in St. Louis, saying: "Sorry to hear about your accident and hope you are making good progress back to complete mobility. Be sure those seat belts are made of Chemstrand Nylon!" Another letter of good wishes came from **"L. O."** and Mary **Buckner.** Buck says he retired last August as sales manager of the Metropolitan Edison Company of York, Pa., and since then he and Mary have driven some 25,000 miles to three different areas of the United States. Your secretary didn't intend to spread our accident report in print as a means of obtaining letters from readers of The Review but now that it has started an avalanche, we hope you will take the hint because we would certainly enjoy hearing from you, too! And don't delay installing and using seat belts in your car!

It is with profound sorrow that we record the passing of four members of the Class of 1921 and send sincerest sympathy to their families on behalf of the entire Class. . . . **Sanford John Hill,** an executive of the legal department of E. I. duPont de Nemours and Company, Wilmington, Del., and head of the label section of the general legal division, died on June 3, 1963. San, who was a nationally known authority on the labeling of chemicals, lived at 102 North Road, Lindamere, Wilmington 9, Del. Born in Scranton, Pa., on August 4, 1900, he prepared for Technology at South Side High School, Newark, N.J. At the Institute, he was a member of Sigma Alpha Epsilon, the Chemical Society, The Tech News Staff, Tech Show Chorus, Glee Club and the Dormitory Committee. He was graduated with us in Course X and spent a year with the New York Telephone Company as outside plant engineer before joining DuPont in 1922 as a chemist in the Arlington, N.J., plastics plant. He was assigned to research work and was responsible for the development and production of low-viscosity pyroxylin nitrocellulose for lacquers. In 1927 he became supervisor of the Arlington color laboratory. He was also an instructor in evening classes in mathematics and chemistry at the Newark College of Engineering. He was later an instructor in higher mathematics and chemistry at the Drexel Institute of Technology evening school. He was transferred to the DuPont Wilmington plant in 1930, where he joined the central research department at the Experimental Station. In 1935, he was assigned to the technical division of the engineering department. After serving in the employee relations department, he joined the legal department in 1944 and was appointed head of the label section. He had been a member of the Labels and Precautionary Information Committee of the Manufacturing Chemists Association since its inception. He was also a charter member and served for many years on the Food Additives Committee of the same association. His memberships included the American Chemical Society, St. John's Lodge, F. & A. M., Newark, N.J., the Masonic Club of Delaware, the DuPont Country Club, and the Westminster Presbyterian Church, of which he was an elder. In 1931, he married Velma C. Vetter of Toronto, Ont., with **Sumner Hayward** as his best man. Besides his wife, he is survived by his mother, Mrs. Henry H. Hill; a daughter, Margaret, who is the wife of James R. Hodges, '51; and three grandchildren. We are in receipt of a warm note from Mrs. Hill in which she says how much M.I.T. and the Class of 1921 meant to Sanford and how pleased they were to join with us at the 1961 reunion. We are indebted to Sumner Hayward, who attended the services in Wilmington, and to **Clark Doane Greene** for aid in preparing these notes.

Henry Hutchings, Jr., Brigadier General, U. S. Army, (retired) died in San Antonio, Texas, on June 26, 1963. Born in Austin, Texas, on February 3, 1892, he was graduated from West Point in 1917 as a second lieutenant, Corps of Engineers. He saw service overseas in World War I, attaining the rank of major. He was assigned to M.I.T. for further training and was graduated with us in Course I. He served as professor of military Science at the Colorado School of Mines, as District Engineer in Louisiana and Kentucky, and was then graduated from the Command and General Staff School. He was commanding officer of the 8th Engineer Squadron and of Fort McIntosh, Texas. He was assigned to Camp Edwards, Mass., in command of the Engineer Amphibian Command and the 4th Engineer Special Brigade, with the rank of brigadier general. He served with the brigade in the Pacific theater of operations during World War II. A recipient of the Distinguished Service Medal, he was also decorated with the Legion of Merit for outstanding service at Lingayen and the Silver Star for gallantry in action at the battle of Manila. He lived in San Antonio at 1612 Grandview and was a member of the Society of Professional Engineers. He is survived by his wife; a son, Henry Hutchings, 3d, of San Antonio; a brother, Alfred W. Hutchings of Hunt, Texas; and three sisters, Mrs. Bess Stratton of San Antonio, and Mrs. R. E. Megee and Mrs. W. N. James of Hunt. We are indebted to **Si Freese** of Fort Worth for his help in preparing these notes.

Mark Lorin Ireland, of 5023 Worthington Drive, Washington 16, D. C., died on June 26, 1963. He was a colonel in the U.S. Army. He is survived by his wife and a son, Maurice T. Ireland, '42, a former lieutenant colonel in the U.S. Marine Corps. Colonel Ireland was graduated with us in Course VI.

Walter Stewart Ross, who had retired from the technical staff of the Bell Telephone Laboratories, died at his home, 3 Pine Drive, Port Washington, N.Y., on October 14, 1963. Born on March 7, 1897, at St. Stephen, N.B., he attended schools in Calais, Maine, and was graduated from Dartmouth in 1918, where he earned the B.S. degree and was a member of Phi Beta Kappa. At the Institute, he was a member of Hexalpha, the Electrical Engineering Society and the T.A.C. He was graduated in the first group of Course VI-A and was an engineer with public Service in New Jersey before entering the telephone field in 1924. During World War I, he served overseas with the 301st Field Signal Battalion of the Signal Corps. He was a member of the Institute of Electrical and Electronic Engineers and maintained his hobbies of woodworking and photography. In 1930 he married the former Virginia Lindemuth of Clearfield, Pa. He is survived by his wife; two daughters, Mrs. Janet Church of Saginaw, Mich., and Mrs. Margaret Tubbs of Oneonta, N.Y.; and four grandchildren.

A subsequent note from **Sumner Hayward** says that he frequently visited with Sanford Hill, most recently on his re-

turn from a trip to the Mardi Gras in New Orleans. Not only had Sumner served as best man at Sanford's wedding but San had also been best man at Sumner's wedding in 1924. Clark Greene added to his notes on San Hill: "I missed seeing him at both the 1956 and 1961 reunions, but he visited me here at our home on Decoy Farm, Rock Hall, Maryland. I am working for the U.S. Army at Edgewood Arsenal. I am a member of the Maryland Society of Professional Engineers and often see **Dug Jackson** of the neighboring Aberdeen Proving Grounds. I also frequently see **Asher Cohen,** who also works at Edgewood Arsenal."

News for these columns is comprised of whatever you wish to send to your secretaries. Why not begin this New Year with that note you have been putting off writing for so long a time? You can bet it will be welcome.—**Carole A. Clarke,** Secretary, c/o I.T.T. Data and Information Systems Division, Route 17 and Garden State Parkway, Paramus, N.J.; **Edwin T. Steffian,** Assistant Class Secretary, c/o Edwin T. Steffian and Associates, 376 Boylston Street, Boston 16, Mass.

'22

As you may have noticed, the Dodgers won in Los Angeles, the weather was dry and hot, the train ride from L.A. to San Francisco was spectacular, and the convenience of jet travel was enjoyable. Your secretary is glad to be back in sunny old Buffalo where winter and summer weather arrive on schedule with no doubt about which is which. However, golf on November 11 was dripping in the valleys. . . . **Lawrence B. Davis,** Vice-president, International Sales, Mobil Sales and Supply Corporation, has been elected chairman of the International Road Federation. Larry has been in the oil industry since graduation and joined Mobil in 1930. He lives at Stoneleigh, Bronxville, New York. I.R.F. is a non-profit, non-political service organization dedicated to the development and improvement of highways and highway transportation throughout the world. . . . **Wallace L. Howe,** retired in July as vice-president and director of research and development of the Norton Company. He began his career in Norton in 1923 and was made product engineer in charge of the technical department just prior to World War II. He became director of development in 1949 and was elected vice president and director in 1954. He has received patents on porous plates, a method of manufacturing vitrified grinding wheels, pump-stones and the Plate 7 tool kilns. . . . **Crawford H. Greenewalt** was elected chairman of the Radio Free Europe Fund in July. The fund, formerly known as the Crusade for Freedom, was founded in 1950 by Generals Eisenhower and Clay to support the broadcasting of Radio Free Europe to Eastern Europe. Crawford became chairman of the board of the DuPont Company last year, after having directed the affairs of the company as president since 1948. As chairman of the Radio Free Europe Fund, Crawford will direct the organization's nation-wide campaigns to insure the continuation and strengthening of the private support for Radio Free Europe's broadcasting operations.

Our sympathy is extended to the family of **Charles M. Taylor** of Westfield, N.J., who died in August. He had been connected with Ebasco International and made frequent and extended trips to Latin American countries as chief mechanical engineer. . . . Previously mentioned was the death of **Donald P. Knight** of Wellesley Hills. Don was sales engineer for Genalco, Inc., in the southeastern Massachusetts and Rhode Island area. In 1962 he was made an honorary life member of the New England Transit Club and was a charter member of the 76 Club in Boston. Don is survived by his wife, Edith Palmer Knight, and sons, Daniel P. of Newton, and Richard P. of Seattle. Our sympathy is also extended to the families of **Harold A. Mosher,** of Weston, **Edward F. English** of Baton Rouge, and **John E. Sallaway** of Titus, Pa. . . . New addresses received include Colonel **Robert S. Barr,** Sarasota, Fla.; **Harry M. Noelke,** Mertzon, Texas; **Thomas H. West,** Hopedale, Mass.—**Whitworth Ferguson,** Secretary, 333 Ellicott Street, Buffalo, N.Y.; **Oscar Horovitz,** Assistant Secretary, 33 Island Street, Boston, Mass.

'23

Two well known management consultants, **George W. Bricker,** of Wilton, Conn., and George W. Ahl, Jr., of Rowayton, have formed the organization of Bricker and Ahl, and will do long range planning, marketing management, product planning, administrative procedures and executive development. Bricker holds degrees from M.I.T., Harvard and Northeastern, and was formerly a vice-president of Celanese Corporation of America and a member of the first Hoover Commission Task Force. For 16 years, he was a principal in Robert Heller and Associates. . . . The following address changes were received from the Alumni Office, with the above items of news: **Clarence P. Thayer,** 50 N.W. 44th Street, Miami 37, Fla.; **Douglas H. Alexander,** 118 Palmers Hill Road, Stamford, Conn.; **Myron K. Chandler,** RFD 4, Waldoboro, Maine; **Charles H. Ducote,** 35 Park Avenue, New York; **C. Russell Ellis,** Garth Woods Apartments, Scarsdale, N.Y.; **Harry Green,** 170 Broadview Avenue, New Rochelle, N.Y.; **Walter E. Richards,** 1770 Green Street, San Francisco, Calif.; **John H. Zimmerman,** 9 Cockenoe Drive, Westport, Conn.; **Francis P. Squibb,** the Sherwin-Williams Company, 188 West Randolph Street, Chicago, Ill.

On November 16, the day after this news is due in Cambridge, **Herbert L. Hayden** forwarded a letter from Miss **Myrna S. Howe,** who is in Helvetie, Montreux, Switzerland. She wrote: "It was most kind and thoughtful of you to forward a copy of our 40th Reunion program. As you see, I am abroad again for perhaps 10 months or so, depending a bit on the weather. If the coming season is as severe as last year's, I fear I will be headed Californiaward. So far we have had a heavenly autumn, and the foliage on the mountainside is glorious. Soon I shall head for Davos for the winter snow and sun. I am sure the 40th was a delightful and memorable occasion, and I regret I could not be there." (Miss Howe's home address is 2157 North Minoro Drive, Altadena, Calif.)

In the absence of much news for this issue, I am prompted to state that I believe you will agree with me when I say that this M.I.T. beaver (your secretary) has the same difficulty as other New Hampshire beavers, when there is either not enough water (class news) to do business or so much water (class news received by the secretary after his submittal is due in Cambridge) that he can make little headway against the flood (editor's deadline dates).—**Forrest F. Lange,** Secretary, 1196 Woodbury Avenue, Portsmouth, N.H.; **Bertrand A. McKittrick,** Assistant Secretary, 78 Fletcher Street, Lowell, Mass.

'24

At the end of the year as we count our blessings and consider the rewarding experiences we have had in life, don't forget to include the years we spent at M.I.T. Think how much it has meant to each of us in the years since, first giving us a start in our professional careers, then as a shining beacon in the free world that shed some of its light on us. As one alumnus remarked, "I have never lost anything in any society by being known as an M.I.T. man."—Now, as we approach our 40-Year Reunion, we have an opportunity to express our appreciation in tangible form through our 40-Year Gift. Most of us are at the peak of our earning powers and have discharged the major part of our family obligations. There will never be a more opportune time. Further, a good many of us are in financial situations where there may well be certain tax advantages to gifts such as securities, properly planned. Of course there are many who have recently made outstanding gifts to M.I.T., but there are many others who gave nothing to the capital campaign or much less than they might have. So do give this careful and thoughtful consideration. There will never be a better time.

Now to the news, and it is a bit on the sparse side this month. **Walt Gress** must have finished that big reservoir job in New Jersey, because cards have been arriving from Europe lately. "So many of the Class of '24 are traveling, we decided to do the same." Paris, Munich, Vienna, and Sunny Italy were on the itinerary, and it undoubtedly came as no surprise that "the Alp road is very steep." . . . Another summer traveler was Dolly **O'Neil, Frank**'s widow. For the second summer she had been to Greece and, "as I teach Homer and Greek drama,

I can take it off my income tax." She had also been to both Jerusalems, Jordan and Israel, and says "it's quite a trick to get to both. One must be prepared to swallow insults from both sides, but it's worth it to relive the Bible." . . . We have a new college professor in our ranks, **Sidney M. Doyle.** For some time Sid has been in Peterborough, N.H., teaching people how to make those miniature ball bearings. Now he has moved upstate. Belknap College recently opened in Center Harbor at the head of Lake Winnipesaukee, and Sid started teaching there this fall. I am not at all sure what his subject is, but since he's also giving a supervisor's training course in Laconia, it is evidently in that general field.

A picture of **Jimmy Wong**'s daughter in her bridal gown comes to hand, and a very beautiful bride she was. More bishops and deans and other members of the clergy assisted in the ceremony than you could shake a stick at. Her husband, Dr. Franklin S. Y. Chen, is a resident in proctology at the Allentown (Pa.) Hospital. By this time, presumably, Bishop Wong is back in Borneo, or at least wending his way there.

Edward J. Devlin graduated as a civil engineer, but never followed that profession. He went into the plumbing and heating business in Lynn, his home town, where he lived until his death in late October. Eddie was a former member of the Lynn Board of Appeals, and a member of the corporation of the Union Hospital. . . . Serena Waterman, **Marshall Waterman**'s wife, met a tragic death in October. Waddy had left his home in northern New Jersey at 7:20 A.M. An hour or so later neighbors saw fire in the house, and Mrs. Waterman was found dead in her bedroom, to which the blaze was confined. Later, a medical examination disclosed that she had been strangled. Our sincere sympathies go to Waddy in his bereavement.—**Henry B. Kane,** Secretary, M.I.T., Room 1-272, Cambridge 39, Mass.

'25

Just after going to press a month ago a note was received from Mrs. **Alexander B. Whitehouse** informing me of the death of her husband, who had died at the New England Medical Center in Boston, on October 4, 1963. He was superintendent of the Lynn Electric Company, having been with that concern since 1929; he worked with the Stone and Webster Company of Boston previous to that time. He had been active in civic affairs during the 34 years he lived in Nahant, and was a member of many of the Masonic orders. He is survived by his wife, who is an active clubwoman in the Nahant area and is chairman of the board of library trustees.

Many of you may have had the opportunity to see the August issue of 'Fortune' magazine, which presented a most interesting article on the Norton Company of Worcester, Mass. The following description of the company is lifted from this article: "This old New England company, owned and run almost entirely by the descendants of the men who founded it, is not only a moneymaker but also a technical innovator, an aggressive competitor, a pioneer in U.S. manufacturing overseas, an exemplar of benign labor relations, and a rallying point of civic leadership in Worcester. Its corporate character bears the 19th-century Yankee stamp of prudence, responsibility, inventiveness and a strong bias in favor of high profit margins. Looking at Norton is like examining an encapsulated history of American industry from handicrafts to the space age. It has a horse-and-buggy atmosphere, but there are synthetic diamonds in the harness, and the whiffletree has Rokide ceramic coatings just like a space-rocket engine." This should be of particular interest to members of the Class of '25 since its president is **Ralph Gow,** the first president of this company who is not a member of the founding family. Ralph is largely responsible for decentralization in the company and for the recent move toward diversification.

Professor **K. C. Reynolds** is probably remembered best as an instructor in hydraulics while we were at the Institute. He is a member of the Class of '25, having obtained his S.M. that year. He was kind enough to send in a few facts concerning himself a few weeks ago. I think it best if you see his story in his own words. It reads as follows: "When I reached the magic age of 65 a year ago, I retired as head of the General Engineering Department at the University of Southern California and was given a lovely luncheon and beautiful gifts by my staff. I was urged to continue to teach, so not only lecture on the campus but also once a week at Edwards Air Force Base under the U.S.C. extension program. Now I am beginning my 44th year of teaching. Following 24 years on the M.I.T. staff, during which I took my master's and doctor's degrees, I was head of the Civil Engineering Department at Cooper Union in New York City for 3 years and, since 1947, have been a department head and professor of civil engineering at U.S.C.

"Of my four years abroad, two (1927-29) were spent in Germany as the John R. Freeman Traveling Fellow of the Boston Society of Civil Engineers, being on leave from M.I.T. During 1954-55 I was a Fulbright professor at the College of Engineering in Baghdad where I created the first fluid mechanics laboratory for instructional purposes in Iraq. During 1958-1959 I was again under U.S. State Department appointment and was acting head of the Mechanical Engineering Department of the Muslim University in Aligarh, India. Mrs. Reynolds and I have costumes and a host of slides for our frequent lectures on the Middle East and on India.

"This fall I am the hydraulic consultant to Bechtel Corporation which is designing the San Onofre Nuclear Generating Station for Southern California Edison. I am in charge of tests, now in progress, on a model of the intake structure for the cooling water. My major community activity last year was as chairman of the Official Board and of the Building Committee for a $95,000-educational unit for the Claremont Methodist Church." In a note transmitting this information Professor Reynolds noted that he and Mrs. Reynolds were enjoying the best of health. Mrs. Reynolds spends one day a week at a hospital in the Los Angeles area playing the piano and reading to the patients, and in addition transcribes Braille for the Library of Congress.—**F. L. Foster,** Secretary, Room 5-105, M.I.T., Cambridge 39, Mass.

'26

This has been an uneventful weekend at Pigeon Cove. It has rained constantly, the ocean has roared from a northeast storm. In addition our road has been blocked due to ditch digging activities (no activity over this holiday weekend) which hopefully will result in a deep water line to our guest house and studio. I say hopefully for I watched a short while early in the week and saw that ditch digging involved removing slabs of rock about the size of a small piano and now they have struck ledge. This description is for the benefit of those of you who live where it is not necessary to bury a pipe four feet to keep the water from freezing and where digging is like eating custard pudding. But so much for our rugged bleak coastline, at least it doesn't wash away. . . . Let's start with a longhand note from our class president, **Dave Shepard,** which we just received: "Dear G.W.: On a hasty visit to these shores (going back to London Saturday) I hear that **Guy Frisbie** has been made the president of his company. He surely deserves a big pat on the back. I send this note (probably needlessly) to make sure you know of it. And to give you my best regards, Sincerely, Dave." No, Dave, we had not received the good news, but now that you have tipped us off we will seek additional information. The most recent information we had was a 1960 annual report of Hobart Manufacturing Company in which Guy was listed as executive vice-president. We will have the up-to-date story by next issue. Meanwhile, congratulations to Guy from the class.

Here is a clipping about our architectural classmate, Mike. **"Michael L. Radoslovich** has retired as director of architecture for the New York City Board of Education to join the architectural firm of Emery Roth & Sons as an associate. During the 10 years he served as design chief of the country's largest school system, Mr. Radoslovich gained a reputation as one of the nation's leading authorities on school planning. In the past decade, Mr. Radoslovich had overall responsibility for the planning of more than 250 schools of all types erected at a cost of nearly one billion dollars." This sounds like a good deal for Mike and for the architectural firm he has joined. Lots of luck in the new venture, Mike. . . . Another clipping tells of the advancement of **Chester Peterson:** "Chester Peterson, '26 has been named chief of the Resistance and Reactance Section at the

National Bureau of Standards, U.S. Department of Commerce. This new Section will maintain and disseminate the units of measurement embodied in the national standards of electrical resistance, inductance, and capacitance and will conduct research aimed at improving these standards and the measurement methods." Congratulations Chet! . . . Recently a member of an adjoining class who reads our notes, Dan Metzger, '27, sent us a clipping by Ben Gross from the TV section of the New York 'Sunday News.' It was a story about Standard Oil Company (N.J.) television programs. Surprisingly enough, at the time the story was written, our class president had this responsibility and here is what the newspaper said about him: "The man most directly concerned with this sponsor's television shows is David A. Shepard, an executive vice-president and director of the corporation. Although he rarely gives interviews, he expressed his thoughts freely as he sat in his spacious RCA Building office, high above the skating rink of Rockefeller Center. Tall, slender, impeccably garbed, a grey-haired figure, he spoke gently and with the certainty of authority. The very picture of a top executive, any movie company would cast him for his role." Not a bad description of our class president, is it! The one detail left out is that he is two meters in height. Incidentally the article itself was interesting and informative and I think you might like to hear some of its highlights: "Shepard leaned back in his chair. 'First of all, perhaps I should explain that Standard Oil (New Jersey) does not sell oil directly to the public. It is a holding company, a parent company, owning shares in operating affiliates engaged in various phases of the oil business or in related enterprises throughout the Free World. It supplies research and technical information, guidance and counsel; it reviews the financial affairs of affiliated corporations, operating results and management performance!" Then Dave went on to explain their reason for selecting television programs without regard to rating: "But—and this is important—business today is far more than mere buying and selling. A company must also have a good public image . . . call it public relations if you like . . . and we have found that the best way to create this image is not only through institutional advertising in print but via high quality television programs." Thanks, Dan Metzger, '27, for sending us this different kind of story about our class president. My monthly reminder to you is please send some notes or clippings! Cheerio.—**George W. Smith,** Secretary, E. I. duPont Company, 140 Federal Street, Boston, Mass.

'27

Ivor B. Yassin died on October 14. He was a consulting aeronautical engineer in New York, and before that in Boston. He came to Tech from Boston English High School, and after graduating in Course IX-B, he obtained a master's degree in Course XVI. . . . Who in our class has worked the longest for one employer? It might be **Carl Peterson** (P.O. Box 10208, San Turce, Puerto Rico), who writes: "Do you remember Professor Jackson's welcome to us as freshmen in the fall of 1923? I had already worked for his firm of Jackson and Moreland for three years at that time. Forty years later I am still working for them. Maybe this gives me some kind of a record. My being in Puerto Rico is just an indication of another assignment. I had already spent a year of my life here and now I will add a couple more. This has become quite a vacation spot. I'd be happy to hear from anyone coming this way—just look me up in the San Juan telephone book." I'd like to do it. . . . A column in the Hartford, Conn., Times gives the following amazing information about Dr. **Fitch Cheney:** (a) he has been head of the department of mathematics at Hartford University for the last eight years; (b) he is a practicing, professional magician of considerable reputation; (c) he has spoken to Rotary Clubs in all of the 50 states, and (d) in 1928, he was granted M.I.T.'s first Ph.D. in mathematics. . . . New addresses received: **Frank Bellini,** 1424 73rd Street, Brooklyn, N.Y.; **E. Robert de Luccia,** 1225 South Skyline Drive, Lake Oswego, Ore.; **Arturo Marques,** Ellauri 714, Apartado 201, Montevideo, Uruguay.—**Joseph S. Harris,** Secretary, Masons Island, Mystic, Conn.

'28

Your class officers wish you a glorious and relaxing 1964 mixed with just enough hard work to keep you prosperous and enough exercise to keep you healthy. . . . Our mail bag is light this month, so we will dip into reports collected at our reunion. A note from **Paul A. Johnson,** Honolulu, Hawaii, states: "I retired and have never been busier." In reply to a question on personal life, family, recreation, travel and plans we read, "Wow! I married a wild widow. She gave me two more sons, and we have two grandsons. We have a ball—travel: Europe, Hawaii for half the year; St. Louis—horse races, weddings. Plan to keep this up and wear the old girl out. She fusses, but I think she likes it. We await another grandchild in July. (just arrived, a girl)." On the reverse side of the sheet of paper is a letter from Paul dated July 9. "In going over my papers this morning I came across this form, which was filled in by my wife at the Cape. It is brief and to the point. As a matter of fact, the "ole girl" travels pretty well and takes a beating. We returned to Honolulu June 21 and have been on the go ever since. Weather has been beautiful here ever since arriving, and I hope it stays the same all summer. We plan to remain until the middle of September and then to St. Louis. Aloha."

From **Franklin McDermott,** 52 Old Farm Road, Darien, Conn., we quote: "I have just completed 30 years in various engineering jobs with Lever Brothers. Now I hold the position of general engineering manager located at Lever House, 390 Park Avenue, New York. Our son and daughter are now entirely on their own. Daughter Pat is married, has two daughters, and is living in Mill Valley, Calif. Son Bob finished in mechanical engineering in Cornell in 1961, and is now living in San Francisco, working with Bechtel Corporation. We are still at the same address in Darien and will travel at the least excuse. We have covered Hawaii, Bermuda, Scotland, England, Norway, and Denmark and are looking forward to more of the same. We are weekend sailors between times." . . . **Bob Harris** of 32 Dwhinda Road, Waban, Mass., simply posted a news clip from the May 1963 "M.I.T. Reports on Research." The clipping states: "A new graduate training program in oral science has been established at M.I.T. with the aid of an initial four-year grant of more than $500,000 from the National Institute of Dental Health. Under the direction of Robert S. Harris, Professor of Nutritional Biochemistry, the program will emphasize the scientific discipline involved in seeking basic solutions to problems of the tissues of the mouth." In answer to our query on personal life, family, recreation, travel and plans he boasts, "Much more of the same."

The June, 1963, issue of "Industrial Hygiene Digest" publishes an article by **Richard D. Hoak,** which was originally presented as testimony before the Natural Resources and Power Subcommittee of the House Committee on Government Operations. Accompanying a photograph of Dick, the editors printed: "Dr. Richard D. Hoak earned his B.S. and M.S. degrees at Massachusetts Institute of Technology in 1928 and 1929 and his Ph.D. at the University of Pittsburgh in 1948. As a senior fellow at Mellon Institute, he has been directing a program of research on water pollution since 1940. His studies are sponsored by the American Iron and Steel Institute, which has sustained a continuing research program in this field at Mellon Institute since 1938. He has been professionally engaged in various aspects of water resources and pollution control since 1934. Dr. Hoak was a chemist and bacteriologist of the Lancaster, Pa., Water Department and a district engineer of the Pennsylvania Department of Health. He has served in elective or appointive positions in the American Institute of Chemical Engineers; American Chemical Society; Pennsylvania Chemical Society; Water Pollution Control Association; American Society for Testing and Materials; and American Water Works Association. In addition, he is a member of the Air Pollution Control Association; the New York Academy of Sciences and Sigma Xi; as well as a fellow of the American Association for the Advancement of Science and the American Institute of Chemists. He is currently serving as a member of the Pollution Abatement Committee of the Pennsylvania State Chamber of Commerce; the Natural Resources Committee of the Chamber of Commerce of the U.S.; the Advisory Board of the International Journal of Air and Water Pollution; and the National Technical Task

Committee on Industrial Wastes."

The only unpleasant part of this job of class secretary is to enumerate those classmates who have recently passed on. It is our sad duty to report that **Francis W. McCabe,** Course VII, of Dorchester, Mass., died March 27, 1963. . . . **Theodore B. Perkins,** Course VI-A, of RCA Industrial Products, Newark, N.J., was killed in an automobile accident on August 8 of this year. . . . **Arthur E. Schneider,** Course V, of Kankakee, Ill., died October 3, 1963. . . . And from the Chelsea, Mass., 'Record' of October 3, we learned that **James Sampson** of that city, an engineer and parks expert with the Metropolitan District Commission for 38 years, was honored when a square was named in his memory on the Revere Beach Parkway. He died in August, 1958, at the age of 58.—**Hermon S. Swartz,** Secretary, Construction Publishing Company, Inc., P.O. Box 255, Lexington, Mass.

'30

Bill Perret is a man to warm the cockles of any class secretary's heart. He recently came through with a 442-word report which unfortunately will have to be abbreviated because of space limitations. Bill spent the year after graduation at the Universities of Berlin and Munich as a Redfield Proctor Fellow and then returned to the Institute for graduate work until 1935. After stints with the Corps of Engineers, Schlumberger Well Survey, Tennessee Eastman at Oak Ridge and the Government Soils Lab at Vicksburg, he joined the staff of Sandia Corporation in Albuquerque, where he is now designing experiments for and analyzing results from large underground explosions. His older son, William E., graduated as an English major from University of New Mexico, where younger son Robert is now a senior and math major. Bill was a co-founder of the M.I.T. Club of New Mexico and is on the Educational Council. Last summer he and his wife attended a symposium on shelter construction in Zurich as guests of the Swiss Government, after which Bill gave lectures in England and Norway before returning home. . . . **Ralph Peters,** as chairman of the Alumni Fund Special Gifts Solicitation for the Rochester area, attended the Alumni Fund Conference at the Institute on September 6, 7. He reports that **Greg Smith,** who was on the program, has "recovered quite well from his disc operation." (I didn't know he had had an operation.) **Dick Wilson** was at M.I.T. the same weekend attending the Alumni Seminars. . . . **Harry Poole** is now director, Military Construction Division in the Office of the Secretary of Defense in the Pentagon. . . . **Ralph Rowzee** has been appointed to the board of governors of the University of Windsor, Ontario. He is also on the board of the Ontario Research Foundation, in addition to his principal job as president and managing director of Polymer Corporation. In 1960 he became the first recipient of the R. S. Jane Memorial Lecture Award established by the Chemical Institute of Canada. . . . **Jim Dadakis,** who moved from business into teaching several years ago, has joined the mathematics and physics department of Westchester Community College. . . . **Alvah Perkins,** who retired from the Air Force as a colonel in 1960, is now a project supervisor in the VA hospital construction program with an office at Room 2828, Munitions Building in Washington. He recently had lunch with **Sam Koren,** one of our five patent examiners, and reports that Sam "does not seem to have changed a bit" and is "just as genial as ever, too." Perk has just designed and built a country home in Gambrills, Md. He says "it was fun while it lasted, but never again!"—**Gordon K. Lister,** Secretary, 530 Fifth Avenue, New York 36, N.Y.; Assistant Secretaries: **Charles T. Abbott,** 26 Richard Road, Lexington 73, Mass.; **Louise Hall,** Box 6636, College Station, Durham, N.C.; **Ralph W. Peters,** 16 Whitestone Lane, Rochester 18, N.Y.

'31

Congratulations to **Dick Baltzer** upon his election as president of Avon Sole Company. Dick joined Avon Sole in 1932 and was formerly executive vice-president in charge of manufacturing. . . . **Gordon Brown** has been appointed to an 11-member committee of the Power Commission which will study possible formation of an industry-wide research and development organization in the electric power industry. . . . During a meeting of Dallas, Texas, leaders in Austin, **Earl Cullum** stressed the needs of north Texas for increased higher education facilities. . . . **Bill Dodge,** President of International Cellulose Research, Ltd., was written up in a recent issue of the 'Pulp and Paper Magazine' of Canada, in an article entitled "Prominent Man." He joined the News Syndicate Company, of the New York 'Daily News' and 'Sunday News,' in 1932, later becoming production manager of the Philadelphia 'Ledger.' In 1940, Bill went with International Paper Sales Company as a technical service representative and served in a technical capacity in the Montreal head office until 1960 when he became a member of the International Cellulose Research organization as assistant executive vice-president. He became president in March of this year. . . . **Art Fitzgerald,** Project Manager and Chief Electrical Engineer, Jackson & Moreland, Inc., has been appointed chairman of the Department of Electrical Engineering at Northeastern University. . . . A recent publicity release from Stone and Webster announced **Art Smith**'s election as a vice-president of the company. Art is chief of S and W's estimating and cost department, a registered professional engineer in Massachusetts and a member of the National Society of Professional Engineers. . . . Radio hams among our class, please note that your class secretary is back on the air—call letters WA-1ASM—and would welcome the opportunity to gather class news by this means. . . . News of **John Fagan**'s death came as a great shock. John was the founder and president of the T & F Engineering Company in East Cleveland, and is survived by his wife, the former Winifred N. Nolan; two sons, John T. and Michael T.; his step-mother; and three sisters. . . . A new address for Dr. **William Metcalf** has been reported. It is c/o Albert Einstein College of Medicine, 1710 Newport Avenue, Bronx 6, N.Y.—**Edwin S. Worden,** Secretary, 35 Minute Man Hill, Westport, Conn.; **Gordon W. Speedie,** Assistant Secretary, 90 Falmouth Road, Arlington 74, Mass.

'32

Professor **Frederick R. Henderson,** Course XV, has been named director of the Computation Center of the Rochester Institute of Technology. Professor Henderson will continue to serve as member of the mathematics faculty of the Institute's College of Science. The objective of the computer center is to strengthen the educational and research programs of the several colleges of R.I.T. Frederick and his wife and two daughters live at 43 Little Brook Drive, Pittsford, N.Y. . . . **Robert B. Semple** has been awarded an honorary doctor of science in engineering degree by Wayne State University. His citation is in recognition of his breadth of interest and active participation in and contribution to professional, business, civic and cultural affairs. . . . **Bennett Archambault** was guest of honor at a National Newcomen Dinner at Chicago honoring the Stewart-Warner Corporation as an important supplier of essential products to virtually all industries. . . . Professor **Manson Benedict** of M.I.T. has received the American Chemical Society award in Industrial and Engineering Chemistry sponsored by the Esso Research and Engineering Company. Professor Benedict was a member of an A.E.C. delegation to the U.S.S.R. last year. . . . The memory of **Robert D. Conrad,** who died in 1949 after a career devoted to the development of research in the Navy, has been honored by the naming of the research ship 'Robert D. Conrad' which recently aided in the search for the submarine 'Thresher.' . . . We have received a letter informing us of the death on October 9, 1963, of **John M. Kimble, Jr.** of Course VIII. His residence was Apt. A4, 1225 Park Avenue, Rochester 10, N.Y. An exhibition of paintings at the Saint-Gaudens Museum in Cornish, New Hampshire, recently displayed the work of **Gardner Cox** of Cambridge, Mass. Portraits of Robert Frost and Judge Learned Hand were recent additions to the famous portraits of distinguished men which have been painted by Gardner Cox.

Mrs. J. B. Traylor (who was **Helen Moody** while at Tech) has not followed engineering as a profession but is vice-president of the Denver Artists Guild. She has maintained a keen perspective for painting landscapes which she exhibits and sells. Her son is attending Colorado College. . . . The above information was

picked up by Colonel **J. E. Harper, Jr.,** who in traveling around the country in connection with speaking engagements, used his Alumni Directory and made some phone calls. More such contacts in Denver and Los Angeles give us the following information: **Frank R. Cook,** Course XVI, is in Denver, Colorado, where he has made a career of investment management for small businesses. He wants us to know he is not with the federal government's small business end. Frank has two sons, 21 and 25 years old—the elder is a student in architecture at Stanford University. . . . **Stanley S. Rudnick,** Course IX-B, is in Denver as regional manager for the Waste King Corporation and travels to several other states including most of Texas. . . . **Charles H. Behse, Jr.,** Course XV, is in real estate management and brokerage in Denver. His engineering comes in handy in the numerous appraisals of property he makes. . . . **Morris I. Poze,** Course XVII, is in Los Angeles. As head of the M. I. Poze Construction Company he does building construction and development. In addition to residential building, Morrie constructs high-rise apartments and operates them until sold. This erstwhile managing editor of 'Voo Doo' now belongs to our growing list of grandfathers. . . . **Everett B. Hulsebus,** Course IV, is in the general construction business in the extensive Los Angeles area as the E. B. Hulsebus Company. He has specialized in the construction of fine residences, which some clients want perched high in the Los Angeles hills on inclines which farther north would be used as ski slopes.

Peter P. Shelby, Course IV-A, is in Los Angeles as secretary-treasurer of Buttress, McClellan and Markwith, Inc. He and his wife are to be envied for the 45-day round-the-world trip they recently completed. Since **Jim Harper** is retiring from the Army next summer, your secretary is hoping that he will find a position in civilian life which keeps him traveling and sending us notes on classmates around the world. This seems likely, since he was a general contractor in San Antonio, Texas, before assuming active duty in 1940; he served as Engineer, U.S. Army, Middle East during World War II, and later was secretary of the Mississippi River Commission, Army Engineer in Alaska, director for logistics for the Defense Atomic Support Agency and lately has conducted National Security Seminars as member of the staff and faculty of the Industrial College of the Armed Forces at Ft. McNair, Washington, D.C.—**Elwood W. Schafer,** Secretary, Room 10-318, M.I.T., Cambridge.

'34

Walt McKay reports for the Reunion Committee: Your 30th Reunion Committee had an enthusiastic first meeting at the M.I.T. Faculty Club on October 15, with 14 classmates present. These included chairmen and members of earlier reunion committees and neophytes with lots of good ideas. It was very evident that **Norman Krim**'s crew is going to lay on a great weekend next June 12-14. The class will have exclusive use of the famous Wychmere Harbor Club (formerly Snow Inn) in Harwichport. **Carl Wilson** will look after the general program with **Paul Wing** and **Larry Stein** to plan the Saturday evening banquet and **Al D'Arcy** to arrange a round of golf or other athletic action for those who want it. **Bob Becker** and **Ernie Massa** will assemble souvenirs and prizes. **Roger Coffey** and **Jim Burke** will concentrate on hospitality, **Del Keily** on registration and **Joe Bicknell** will see to transportation. **Mal Stevens** will work on promotion, with Walt McKay to help on notes for this column and **Lou Frank** to take care of mailings. **Les Doten** will be in charge of finances and Norman Krim is chairman. You can reach him at Room 33-213, M.I.T., Cambridge 39.

Norman Krim, our reunion chairman, also deserves recognition, though belated, for his work as National Chairman of the 1963 Fund Drive at Clark University where his son Arthur is a student. . . . **Dan Strohmeier** broke into the press again in October with some strong and thoughtful words about the government subsidy of Navy shipyards and the resulting economic tragedy to the entire shipbuilding industry. As vice-president of the Bethlehem Steel Company in charge of its shipbuilding division, he can see the picture all too clearly. Unfortunately it is a picture which applies, in varying degrees, to many other forms of American private enterprise and we badly need to hear more "voices in the wilderness." . . . Lieutenant Colonel **Mandell D. Stoller** (U.S. Army, Retired) died in East Orange, N.J., last August. He was a Course I graduate and served 26 years in the Army Engineer Corps. . . . **William Beckett,** President of the Beckett Paper Company of Hamilton, Ohio, was elected last summer to the board of trustees of Western College for Women. The press release covering this matter provides the information that he has been extremely active on management and professional boards and committees, and has also had a busy political life (elected six times to Hamilton City Council, twice as Mayor, and to the Ohio Senate).

Along with other activities at the reunion in June will be the regular Class of 1934 meeting. **Rudy Churchill** has already organized the nominating committee which was appointed (by overseas air mail from Saudi Arabia) by Class President **Hank Backenstoss.—G. K. Crosby,** Secretary, 44 Deepwood Road, Darien, Conn.; **H. E. Thayer,** Secretary, 415 West Jackson Road, Webster Groves 19, Mo.; **M. S. Stevens,** Secretary, 9 Glenfield Road, Barrington, Rhode Island; **J. P. Eder,** Secretary, 1 Lockwood Road, Riverside, Conn.

'35

Congratulations to **Sid Grazi,** winner of the President's Cup for 1963 and Class Golf Champion in the Third Annual Tournament. Congratulations also to **Dick Bailey,** runner-up, who made a close match of it. Dick for the third year in a row, had the best low gross, a 73, and on a 72 U.S.G.A.-rated course, no less. Sid won the hard way by winning all his matches in the Consolation-Second Flight after not being able to play his opening round with **John Kiker.** All in all it was a very successful tournament, the drawings were arranged so that first round matches could be played in person on a regional basis and the result was that only two-thirds of the matches had to be played by mail. If we are ever able to get most of the 100 classmates who play golf to enter this affair, it would be fun to have regional champions who would play off in a final.

From the change of address note received it would appear that Raytheon now has **Tom Hafer** working at its Italian subsidiary. Tom's new address is Selenia S.P.A., Casella Postale 136, Naples, Fusaro, Italy. . . . **Pete Grant**'s new home in Nashua, N.H., is at 48 Dublin Avenue. . . . This is the first time since I took on this job of writing the class notes in June, 1960, that I have no letters from any classmates on which to draw. This is understandable because for three months, I have had no office duplicating facilities available so I could get my usual monthly advance copies of the notes off to the other class officers and district secretaries. These were good reminders that it was time to write to the secretary. If some of you don't start writing soon, I will have to fall back on the activities of my 9-year-old in the Junior Girl Scouts, my 8-year-old twins in the Cub Scouts, the cleverness and cuteness of my 13-month-old and last, but most important, my beloved wife, typer of these notes and my secretary during this unnerving period of getting relocated. So, if you forgot to send me a newsy Christmas card, please write to me now. Happy New Year!—**Allan Q. Mowatt,** Secretary, 11 Castle Road, Lexington, Mass.; Regional Secretaries: **Edward C. Edgar,** Kerry Lane, Chappaqua, N.Y.; **Hal L. Bemis,** 510 Avonwood Road, Haverford, Pa.; **Edward J. Collins,** 904 Merchandise Mart, Chicago 54, Ill.; and **Gerald C. Rich,** 105 Pasatiempo Drive, Santa Cruz, Calif.

'36

From **Dick Bryant** comes the following: "It is sad to announce that **James L. Vaughan,** X, of Summit, N.J., died June 8 of a heart attack. It seemed a little more untimely than usual in that just three months earlier he had completed work on an invention, received backing from American Research, and formed and became president of Separation Processes, Inc. He had spent the weekend of May 30 at his cottage in West Dennis and had talked enthusiastically of the prospects of his company both in this country and abroad. He leaves his wife, Mary, and three children, Jim, Jr., a freshman at Colby College, Katherine, and Warren. The Bryants and the Vaughans are neighbors at West Dennis. To Jim's fam-

ily the Class of '36 extends its expression of sincere sympathy.

James Seth has been appointed staff assistant to Tidewater Oil Company's Western Division manufacturing manager with headquarters at the Avon, Calif., refinery. He is living with his wife and 13-year-old twins at 42 Morello Road, Martinez. . . . **Joseph Lukesh** has moved from South Sudbury, Mass., to 320 North California Street, San Gabriel, Calif. . . . **Kwok C. Chan**'s address is Un Long New Territories, Hong Kong. . . . **Dr. Charles J. Rife**'s is Route 2, Mechanicsburg, Pa.; and **Francis Lessard** may be reached at Box 267, South Easton, Mass. . . . It gave me a start as I began to type up these notes to have the heading 1964. My, how Time flies! Best wishes for the new year to you all. —**Alice H. Kimball,** Secretary, 20 Everett Avenue, Winchester, Mass.

'38

If you want current news you should buy a newspaper. But if you want interesting discussion, let's talk for a minute about the fame **Al Wilson** achieved six months ago when he was cited by Time magazine as a lay leader in organizing adult Christian education. He lives in Lexington, and in 1948 Al engaged the new minister there in a discussion of how to interest adults in serious study (one is always encountering adults who have never studied before). Together they started an experiment in group learning that is based solidly upon an interest in people. Now Al and Carol have learned how to nurture interest, and have shared their experiences with a number of communities. Newcomers to their Lexington parish, and any others interested, are called by a central committee (primarily Al and Carol) and told about the 10 study groups—when they meet, what kind of people they include, what they are studying, how sophisticated they are, etc. If the inquirer elects to visit a group, he is checked a week or so later to see if he liked it and felt at home; if he wants to explore some other group, he is encouraged and helped. With this kind of friendly concern, many inquirers find a meaningful and pleasant circle of serious students. Time called such study groups ". . . dedicated Christians who have found that in company with a few fellow believers, they can learn about theology and the Bible and grapple with the concrete problems of living as a Christian in a secular society." . . . **Dave Acker** reports, "In a sense one might consider Al the spiritual grandfather of the Bible study group we started here in Santa Monica three years ago, since he was instrumental in getting us started in his group in Lexington."

Two weddings of 1938 siblings have come to our notice. **Ravi Kirloskar**'s daughter Jayashree was married to Ramesh Subbiah in her parents' home in Bangalore shortly before our reunion. Ravi was in the U.S. a couple of years ago, negotiating representation and sales for Kirloskar Electric Company, Ltd., a company which celebrated its 100th anniversary last year. More recently Ravi reported from Tokyo the good health of **Yoshio Mikimoto,** whom he called upon at East Asiatic Consultants to recollect a few exciting nights in the dorms. Ravi sent along a few color prints to prove that Mikimoto is indeed a competitor of ours. . . . **Bruce Old**'s son Ed was married this summer to Wendy Gibbons, in Stowe, Vt. Bruce was best man for his son and the family participated extensively, with daughters Barbara and Ashlee as bridesmaids, and sons Randolph and Lancing as ushers.

Howie Banzett represented M.I.T. at Franklin and Marshall College, right next door to the Lancaster plant which Howie manages for Alcoa. Occasion was the inauguration of Keith Spaulding as new president of F and M. **Bill Shuler** represented the Institute at the 75th anniversary celebration of Georgia Institute of Technology. Bill has been with Lockheed-Georgia since 1956, and found Marietta just a stone's throw from Atlanta. . . . Hard on the heels of reunion came the public announcement of **Erich Nietsch**'s appointment as vice-president of Sales and Project Development of the Robinson Vibrashock Division, manufacturers of vibration isolation equipment. Erich was cited for his prowess as a glider pilot (which is about as vibration isolated as I know!), and as co-author of "Theory of Flight" and "Clouds, Weather, and Flight." . . . **Don Holloway,** who spent 17 years exploring the chemistry of leather and consulting in leather manufacture, has been put in charge of sales development for Rohn and Haas Leather Chemicals Sales Department. . . . **Charles Jahnig** has been appointed senior engineering associate at Esso Research and Engineering. Chuck is currently working on the development of a new process for making coke suitable for use in aluminum manufacture, an extension of his pioneering in the field of fluid coking.

We have an impressive brochure from Audiology Research Consultants, Inc., listing **Vince Salmon** as the director of their surveys and noise analyses for hearing conservation in industry. Vince is manager of the sonics department of Stanford Research Institute where "any wave motion in a material medium is of interest." He had earlier reported that sound recording was his hobby, gadgets his fascination, and storage space his crisis. . . . Colonel **Nathaniel Martin** who took an S.M. in Course II with us, spoke to the Minnesota Society of Architects in September about his activities as director of facilities planning and construction for IBM Corporation. He is a former president of the Industrial Development Research Council. —**Frederick J. Kolb, Jr.,** Secretary, 211 Oakridge Drive, Rochester 12, N.Y.

'39

Howard H. Reynolds, X-G, formerly vice-president of research and development, Ludlow Corporation, Needham, Mass., in the plastics and paper division, has been selected to head the Department of Chemical Engineering and Paper Engineering, Lowell Technological Institute, Lowell, Mass. . . . **Henry C. Littlejohn,** VI-A, manager of General Radio's Mechanical Design Group, in West Concord, Mass., was recently awarded a citation for his design of General Radio's "Flip-Tilt" case in which many of the company's products are now packaged. Henry developed a combination aluminum cabinet and carrying case for precision measuring instruments. The citation was awarded at the National Conference of the Product Engineering and Production Group of the Institute of Electrical and Electronics Engineers. . . . **Henry Knippenberg,** II, General Manager of A. O. Smith's Meter and Service Station Equipment Division since January, 1963, was recently elected a vice-president of the corporation. Prior to joining A. O. Smith, Henry served as president and general manager of the Dresser-Ideco Division of the Dresser Industries, Columbus, Ohio.

In a Boston Globe clipping about New Englanders in Israel, there was a brief mention of **Joseph George Zeitlen,** I. He is a professor and dean of civil engineering at Technion, the Israel Institute of Technology, in Haifa. . . . **Robert B. Gordon,** XIX-G, has been named director of product operations of the newly formed product operations division of Atomics International, a division of North American Aviation, Inc., in Canoga Park, Calif. Dr. Gordon is acting director of another department of the company, central engineering and reliability. Dr. Gordon and his wife and two sons live in Northbridge, Calif.—**Oswald Stewart,** Secretary, P.O. Box 1238, Moravian Station, Bethlehem, Pa.

'40

Ed Josephson was guest speaker at the Western Massachusetts Home Economics Association meeting in September. Ed is associate director of food radiation for the U.S. Army Quartermaster Research Center in Natick, Mass. His subject was foods of tomorrow. . . . Your secretary was in Cambridge recently on business. For once, his work only took a short part of the day, and as a result he was able to visit with several classmates in the Boston area, including **Sam Goldblith** and **Phil Stoddard** at Tech, **Milt Green** of Polaroid, and **Ed Kingsbury,** who is now with the Unitarian-Universalist main office in Boston. Ed finds his new work very satisfying despite the fact that it is a complete change from anything connected with his M.I.T. training. **Edith (Cameron)** has not gone to work but is relaxing (?) as a housewife. . . . I have used some of the new color Polaroid film, and Milt gave me a few tips on the best way to take the color photos. It is very important that the film not be maintained in the camera over 60 seconds. Milt is the holder of several patents involved in the Polaroid color process.—**Alvin Guttag,** Secretary, Cushman, Darby & Cushman, American Security Building,

Washington 5, D. C.; **Samuel A. Goldblith,** Assistant Secretary, Department of Food Technology, M.I.T., Cambridge.

'41

By way of further information on the untimely death of **Frank J. Storm, Jr.,** 3209 Hawthorne, Amarillo, Texas, the latest report states that he was found shot to death in his office in Amarillo. Frank was a colonel in the air force reserve and chairman of the Amarillo airport board. In 1939 he was a member of the Amarillo airport board. In 1939 he was a member of the Byrd polar expedition. He was a World War II member of the United States embassy staff in Moscow. . . . **James Cooper Livengood** of Weston Road, South Lincoln, Mass., died suddenly at Emerson Hospital, Concord. He was a member of the American Society of Automotive Engineers, the American Society of Mechanical Engineers, the American Institute of Aeronautics and Astronautics, the Combustion Institute and Sigma Xi. He was associated with the Sloan Laboratory of Automotive and Aircraft engines at M.I.T., and later with the Small Aircraft Engine Division of General Electric at Lynn. Since 1959 he had been a project engineer with Joseph Kaye and Company in Cambridge. He had lived in Lincoln for the past 20 years. He leave his wife, Eleanor (Hayes) Livengood, a son, Peter Cooper, and three daughters, Martha, Rebecca and Lucy, all of South Lincoln, and a sister Margaret Ann Livengood, M.D., of Kentucky, the state of his birth.

Mitchell J. Marcus, President of Production Systems, Inc., 144 Moody Street, Waltham, Mass., was recently in the news with his company which specializes in setting up and handling data processing for the small business man. Mitch says that his company's data processing facilities will make laborious bookkeeping details obsolete for the small business man, freeing him for concentration on major business planning.

Robert L. Wooley has been appointed manager of engineering for the recently established peripheral equipment business in General Electric's computer department at Phoenix, Ariz. He was formerly manager of engineering for the armament and control products section of the light military electronics department at Johnson City. He joined General Electric at Syracuse, N.Y., in 1948.—**Walter J. Kreske,** Secretary, 53 State Street, Boston 9, Mass.; **Henry Avery,** Assistant Secretary, 169 Mohawk Drive, Pittsburgh 28, Pa.; **Everett R. Ackerson,** Assistant Secretary, 16 Vernon Street, South Braintree 85, Mass.

'42

I do not have too many items this month because of the great difficulty in getting you fellows to write to me. Just remember that your fellow members of the Class of '42 are interested in your whereabouts and keeping abreast of your achievements—so, I plead for newsy letters. . . . **Eddie Thode** who, as many of you know, is now Dr. Thode, was recently named head of the Department of Chemical Engineering at New Mexico State University. . . . **Lloyd St. Jean** has been elected a director of Sanders Associates in Nashua, N.H. Many of you probably know that **Mort Goulder** is also a director at Sanders Associates. . . . Some months ago I brought you up to date on **Pete von Wiesenthal** who, as I am sure most of you remember, is executive vice-president of Alcorn Combustion Company. I am pleased to note that Alcorn is now a member of the M.I.T. Associates Program and it is just possible that I might see more of Pete because of the affiliation of his company with the Institute. Let's hope so!

Finally, I have the most unhappy task of reporting the accidental death of **Ian Davies** who was tragically killed on November 9 by a truck while waiting in the breakdown lane of Route 46 as a mechanic worked on his car. He is survived by his wife and three sons, ages 12, 14 and 16. I have written to Mrs. W. E. I. Davies expressing the class's deep sorrow. If any of his friends wish to write to Mrs. Davies, the address is 1 Moraine Road, Morris Plains, N.J.—**Jack Sheetz,** Secretary, Room 3-344, M.I.T., Cambridge 39, Mass.

'43

On September 1 your secretary mailed out 96 Reunion Handbooks to classmates whom he thought would be interested in having them, at $1 apiece, and to date I have received $53 in replies. This leaves 43 unpaid. There are about 40 copies remaining of this 52-page booklet, which contains biographies and addresses of our classmates, and I will be happy to send a copy to anyone who requests it upon receipt of $1. The 20th Reunion ran at a loss of $140, and the Reunion Handbook publication has lost $160. Our treasury has a balance of $200. . . . **Thomas K. Dyer** of Lexington, Mass., recently resigned as chief engineer of the Boston and Maine Railroad and entered practice as a transportation and engineering consultant. . . . **Morton Schultz** is with Bache and Company, Wall Street, New York, where he is a trader in the metals department. . . . **Frank Gardiner** has moved from Moorestown, N.J., to Weston, Mass. . . . **John Gayton** was elected a principal associate of Cresap, McCormick and Paget, international management consulting firm, in June. He is with the midwestern division in Chicago, and prior to joining this firm was director of marketing for Dole Valve Company. He received his master's in business administration from Harvard in 1947.

Jack McDonough, our midwest secretary, wrote that **John H. Alschuler** recently opened his own architectural offices at 160 East Grand Avenue, Chicago, specializing in design and service to business and industry. . . . **Gilbert Graves** was named superintendent of the north plant rolling mill of ALCOA's fabricating division plant in Alcoa, Tenn., in July. He has been with Alcoa since graduation, except for time out in the Navy. . . . . . **Douglas L. Brooks,** who received his master's in meteorology with our class, and his doctorate also at M.I.T., was elected president of the Travelers Research Center in Hartford, Conn. He succeeds Dr. Robert M. White, '49, who became chief of the U.S. Weather Bureau.

E. Donald Hoyt has been named manufacturing manager for American Optical Company, Sturbridge, Mass., and will be responsible for the frame, lens and case operations of the company at the Brattleboro, Vt., and Frederick, Md., plants. . . . Alan Katzenstein, '42, sent me the August 21 issue of Investor's Reader, which contains an interesting article about Dymo Industries, producers of plastic and metal tapewriters, price-tag making, labelling, embossing and addressing equipment, which company is headed by classmate, **Rudolph Hurwich.** This company, whose sales rose from $630,000 in 1959 to $10,390,000 in 1962, makes those tapewriters we all know so well because we see the tape labels on everything these days. I tried one out yesterday, and except for the misspelling, my name came out just beautifully. In 1958 Rudy's longtime associate, Leo Helzel, met the inventor of the Dymo labeling system by which plastic tape can be cold embossed with letters and numbers, who joined with them when they took over the ownership of the company as Dymo Industries. They subsequently added other marking devices to their product lines, and in rapid succession took over Roovers-Lotsch Corporation, Trig-A-Tape, Sten-C-Label, and, their biggest acquisition to date, Elliott Industries of Cambridge, Mass. Rudy is certainly to be admired and congratulated for his leadership in the growth and phenomenal success of Dymo Industries. I am tempted to write him for a free sample of the $49.95 kit which I fondled yesterday.—**Richard M. Feingold,** Secretary, 10 North Main Street, West Hartford, Conn.

'44

I received a very nice telephone call from **Paul Robinson,** XVI, who is in Washington, D.C., as a program analyst in the Program Evaluation Center of the Office of the Secretary of the Navy at the Pentagon. Paul and Camilla have lived in Washington since 1956 and have four children, the oldest 8½ and the youngest 16 months. Paul has been running into **Sam Parkinson,** II, who is with Grumman Aircraft and lives in Oyster Bay, L.I., New York. Also an occasional visitor to Washington is **Robert A. Veitch,** XVI, who is with Grumman and lives in Huntington, Long Island. Paul also sees **Ed Sanders,** VI, who lives in Arlington, Va., and is president of Allied Plywood Cor-

poration, also in Arlington. Ed founded Allied Plywood Corporation, and he and his wife, who is treasurer, operate the company. Paul made a telephone call from Washington to give me this information, which was very much appreciated. . . . A note received from **Arthur Peterson, Jr.,** III, brings the following biographical information: "As our 20th Reunion draws closer, you will probably get mail from any number of voices in the past, so deal me in. The idea of Lenox is dandy, by the way, so if it gets down to a vote, here is my proxy in favor. Brief biographical data for your file: Since I was married during the war, I didn't see many people when I went back to finish, but I graduated in '47. I spent 10 years with Bethlehem Steel, partly in research, later in operations. In 1956, I came up here as assistant manager of Jones and Laughlin Steel's New York Ore Division. That last is a fancy title for second in command at an iron ore mine in the Adirondacks. I married Ronnie Phoenix (Radcliffe, '44) and we have six kids, ranging from 18 down to 5, three boys and three girls. This is vacation country, with skiing and lakes, so we are very contented. As a matter of fact, we are just completing the building of a house on a five-acre wooded lot on Star Lake. I guess the only classmate I have seen in recent years has been **Stan Skelskie,** who came up here on a vacation and occupied the cabin next to us at a nearby lake. We have been in the habit of renting a cottage for part of the summer, which conserves vacation time for me. Anyway, I looked at him, and he looked at me for a few moments, but we remembered. Maybe the years haven't been too cruel. So there you are. Ski enthusiasts should visit here. Our local tow isn't much, but it's only $5 a season for adults."

A note from the 'Weekly Contractor' indicates that **Richard B. English,** II, Executive Vice-president of Murphy & Miller, Inc., Chicago, has been elected a director of the Refrigeration and Air Conditioning Contractors Association. Prior to joining Murphy & Miller in 1960, Dick was York Corporation's midwest regional sales manager, covering 13 states. . . . A note received from 'Electrical News' reports that **Bob Neel,** VI, recently presented a paper on "Technical Advantages of Multi-Channel Stackable Multiplied Equipment." Neel started his career with Western Electric Company and Bell Laboratories and in 1956 joined Stromberg-Carlson in Rochester, N.Y. Presently he is engineering section supervisor for transmission and components. He has been associated with the development of message circuit dialing. . . . A note from the Northwestern Engineer of Northwestern University indicates Professor **G. K. Krulee**, X, is now Dr. Krulee, having finished his Ph.D. in psychology in 1950. He is the author of a book entitled "Engineers at Northwestern." . . . A note from the 'Optical Index' advises that **Corwin H. Brumley,** VIII, has been appointed director of research and development for Bausch & Lomb, Inc. in Rochester, N.Y. Corwin has been with Bausch & Lomb in Rochester since he finished his postgraduate work and worked with the M.I.T. Division of Industrial Co-operation. . . . The National Broadcasting Company sent us a release indicating that **Carl Lindemann, Jr.,** V, has been appointed vice-president of N.B.C. sports. Carl has been with N.B.C. since 1948 when he started as a student engineer. Carl has been associated with a number of N.B.C. television shows and he was most recently director of daytime shows for N.B.C. . . . Gordon Lee, Secretary-Treasurer of Central Research Labs in Red Wing, Minn., is also head of the local board of education. . . . **Bob A. Plachta,** XV, has been appointed director of administration of Charles W. Adams Associates, an organization specializing in electronic data processing.—**Paul M. Heilman,** Secretary, 30 Ellery Lane, Westport, Conn.

'46

Robert L. Jacks writes for the first time in many years to report his new job. Bob earned his M.S. in chemical engineering in 1946, spent some time with the Humble Oil Company in Baton Rouge, La., and then joined the M. W. Kellogg Company in New York in 1954. Since 1958 he has been senior project manager for Kellogg. On November 1 he moved to Atlanta, Ga., to become manager of engineering for the Armour Agricultural Chemical Company, P.O. Box 1685, Atlanta 1, Ga. . . . A clipping from a recent I.E.E.E. Proceedings tells us that Dr. **John D. Mallett** (M.S., '46) has been with the electronics department of the Rand Corporation since 1949, working on system studies, radar, and electronics, primarily involving defense against missiles and aircraft. The above completes the newsy items available for this issue. We do have some address changes and will fill out the column with them. Colonel **Clarence L. Battle, Jr.,** Crystal House, 1900 Eads Street, Apt 829, Arlington, Va.; **John H. Fleming,** 854 North 10th Avenue, Upland, Calif.; Commander **William H. Semple,** 31 Grove Street, Haddonfield, N.J.; Reverend **Ellsworth E. Koonz,** 129 Russell Street, West Lafayette, Ind.; **Wendell R. Helmolt,** 47 Philip Henry Circle, Windsor, Conn.; **Harold J .Gordon,** 406 North Carolina Street, Arlington Heights, Ill.; Dr. **Malcolm Gordon,** F4 Forest Hills Road, Garden Hills, Bayamon, Puerto Rico; **Warren J. Grosjean,** 198 Old Dyke Road, Trumbull, Conn.; **Andrzej B. Przedpelski,** 7260 Terrace Place, RFD #1, Boulder, Colo.; **Theodore W. Henning,** 32 Woodedge Road, Manhasset, N.Y.; **John Kinahan, Jr.,** 96 Rue de Longchamp, Neuilly-Sur-Seine, France; **Arthur Schiff,** 329 Fawn Ridge Drive, Scotch Plains, N.J.; **Gifford Stanton,** North Wilton Road, New Canaan, Conn.; **Henry E. Cradduck,** 36 Lincoln Circle. Andover, Mass.; **Bruce F. Curran,** 18 Vassar Drive, Newark, Del. Mrs. **Richard H. French,** Avenida La Paz 1429, Guadalajara, Jalisco, Mexico; Commander **John R. MacLachlan,** 4108 Cleveland Place, Metairie, La.; **Harold Oakes,** 48 Holly Glen Lane, North, Berkeley Heights, N.J.; **Louis A. Payne,** 2125 Thorley Road, Palos Verdes Estates, Calif. . . . We are very sorry to have to report the death of **Robert W. Gardner.** Bob had made his home at 49 Garrison Road, Hingham, Mass.—**John A. Maynard,** Secretary, 25 Pheasant Lane, North Oaks, St. Paul 10, Minn.

'48

Roger L. Sisson, Director of Advanced Systems for Auerbach Corporation, has written in 'Systems' July, 1963, an article entitled "Will Computer-to-Computer Communications Change Management's Future," which provides a clear warning to those of us who are far from the home office. Roger contends that increased use of computers in management activities and improvement in communications techniques will provide top management with the information necessary for the exercise of direct control over remote operations and that such control will then be exercised. It was difficult enough to beat city hall before they got the computer. . . . **Elwyn E. Winne,** Vice-president of Polymer Chemicals Division, W. R. Grace and Company, was recently interviewed in 'Modern Plastics.' He joined the Grace organization in 1948 as a chemical engineer and has since contributed much to the development and application of high density polyolefins for moldings, extrusions, and coatings. Mr. and Mrs. Winne and their four children live in Ridgewood, N.J. . . . Our former secretary, **Richard H. Harris,** has been appointed director of corporate development by Norton Company, Worcester, Mass. The assignment will include development of the corporate plans for diversification and their implementation. Dick's activities (see class notes, May, 1963), which are reported through the clipping services, are certainly an aid to his successors. We hope that he keeps up the good work.

During a recent trip East I contacted **Jack C. Page** who, along with wife Imogene and the little Pages, lives in the environs of Chicago. Jack is with Booz, Allen and Hamilton and apparently is enjoying being a management consultant. Jack mentioned several other classmates in the Chicago area, in particular, **Warren J. (Duke) King,** who is director of communications with Albert Raymond and Associates; **John R. Kirkpatrick,** who heads the Chicago office of Arthur D. Little. I also contacted **J. Kail Crane,** who, as I remember it, wanted to join the Cook County Highway Department upon graduation: he did, and has remained. J.K. is a bachelor and gave no hint that he was about to change status.

During a brief stop at my home office, Goodyear Aerospace Corporation, Akron, Ohio, I saw **Norman E. Whitchurch,** who is manager of trainer and electronics systems engineering. Norm and his wife Evelyn, who were once denizens of Westgate, now reside, with two not-so-little Whitchurches, under rather

improved circumstances. Norm and I both joined Goodyear Aircraft upon graduation and outlasted the company, as it is now called Goodyear Aerospace Corporation.—**Richard V. Baum,** Assistant Secretary, 1718 E. Rancho Drive, Phoenix 16, Ariz.; **Robert R. Mott,** Secretary, Hebron Academy, Hebron, Maine; **John T. Reid,** Assistant Secretary, 80 Renshaw Avenue, East Orange, N.J.

'49

I am writing this column while en route from London to Boston for a brief pre-Thanksgiving visit to Arthur D. Little's home office. The 15th Reunion campaign literature reached me just before departure and I plan to pay my class dues and put my name on the "hope to come" list as soon as I touch down. If any of you classmates postponed this step last November, you can consider this a general reminder to search through the desk drawers and find, fill out and send in the necessary information. Next month we should have the first returns of names of those who hope to attend. . . . Since the news clippings are being sent to me and since I missed last month's issue (to my disgrace), there are a dozen items this month to bring us up to date on class accomplishments. . . . Under the headline "Whiz Kids Shape Pentagon Policy, But McNamara Really Runs Show," the following paragraph appeared: "**Henry S. Rowen,** 37, a Bostonian, M.I.T. graduate, did graduate work at Oxford and is another product of Rand. Tall, sandyhaired, studious-looking, he has had great impact in formulating limited and conventional war policies." . . . From Monterey, Calif., comes word that **W. Webster Downer** of Carmel has been named business officer at the Security National Bank's office in the Carmel Rancho Shopping Center. He will also head a new military service department of the bank.

Robert L. Hamman (S.B., M.S., M.I.T., Ph.D., Harvard) is now an analyst in the planning department of Mobil Chemical Company, having moved there from DuPont. . . . **William R. Opie** presented a paper entitled "Purity and Impurity: The Influence of Production Techniques on the Properties of OFHC Brand Copper," in a fall seminar held to discuss the properties of electronic grade copper. He is director of research and development, United States Metals Refining Company, a subsidiary of American Metal Climax, the seminar sponsor. . . . We wish Dr. **Robert M. White** well as the President's appointee as chief of the U.S. Weather Bureau. He is following in tough footsteps, those of Dr. Reichelderfer who was head of the Bureau since 1938. Perhaps if he is lucky Dr. White will preside over a real breakthrough. As the Oregon Statesman put it in an editorial on the presidential appointment: "His professional training and record appear to qualify him for the new office. And if his research experience equips him to do something about making weather as well as prophesying it, the country should prosper at his hands."

Captain **James C. Wootton** is the new chief of the U.S. Naval Avionics Facility in Indianapolis. In an interview he says he has never had a dull assignment in 26 years in the Navy. . . . Dr. **Walter G. May** has been appointed a senior research associate at Esso Research and Engineering Company, Linden, N.J. He is in charge of work on motor formulation and evaluation on a high energy propellant project. . . . Lieutenant Colonel **Carroll E. Adams** was graduated from the Army War College at Carlisle Barracks, Pa., in mid-June. . . . **Paul B. Ostergaard** has been elected vice-president of the recently incorporated acoustical consulting firm of Lewis S. Goodfriend & Associates of Little Falls, N.J. . . . **Walton Forstall, Jr.,** George Tallman Ladd Professor of Mechanical Engineering, has been appointed associate head of the Department of Mechanical Engineering at the College of Engineering and Science, Carnegie Institute of Technology. . . . **William E. Stoney, Jr.** has been named chief of the Spacecraft Technology Division of Manned Spacecraft Center's Office of Engineering and Development. He was formerly chief of advanced vehicle conceptual studies in the office of Advanced Research and Technology at National Aeronautics and Space Administration headquarters in Washington. . . . **Norman Chrisman** represented M.I.T. at Kentucky State College on October 11 at the inauguration of Carl McClellan Hill as seventh president of Kentucky State College. Norman also serves as an Educational Counselor to M.I.T. . . . The following report on the activities and plans of the Reunion Committee were sent in by our correspondent in Newton Centre, Mass., **Fletcher Eaton.**

The Reunion Committee met Tuesday evening, November 5, at the Faculty Club for a supper meeting to pound out details of the program which will await us all next June at our 1964 Beaver Party Convention. As we told you, the entire weekend will be patterned after a real presidential convention with a few wrinkles thrown in that no politician ever thought of. There will be something for everyone to do either in helping with the festivities or in taking advantage of the Belmont Hotel's fine facilities. The latter include putting greens, shuffleboard, tennis courts, enjoying the beach, or dancing to the hotel orchestra. **Russ Cox** offers the use of his partner's 55-foot yacht for fishing parties. (Yes, he checked with his partner first.) The Beaver Convention will be divided for voting purposes into groups representing the Northwest, Southeast, Southwest, Middle West, New England, Southeast, etc. Twenty-eight chairmen of state delegations have already been appointed. **Adriaan Van Stolk** from Holland will head the Hawaii delegation. Others are **Jack Baker,** Michigan; **Jack Barriger,** Assistant Chairman for California; **Lou Basel,** Assistant for Connecticut; **Bill Beaton,** Maryland; **Milt Bevington,** Georgia; **Stan Collis,** Indiana; **Bert Chope,** Ohio; **Wallace Douglas,** Vermont; **Dave Gaillard,** Virginia; **Bob Griggs,** Puerto Rico; **Jabez (Stoney) Harford,** Assistant for New York; **Archie Harris,** California; **Tom Hilton,** Pennsylvania; **Chuck Holzwarth,** Illinois; **Charley Jackson,** Wisconsin; **Bill Jones,** Assistant for Massachusetts; **Bob King,** Assistant for Massachusetts; **Harold McInnes,** Texas; **John Miller,** Assistant for Illinois; **Len Newton,** New Jersey; **Lou Peloubet,** Connecticut; **Bob Nesbitt,** Florida; **Herb Spivack,** Rhode Island; **Tom Toohy,** New York; **Tom Tsotsi,** New Hampshire; **Joe Vitka,** Massachusetts; and **Bob Walton,** Alaska (though he lives in California).

The theme for Friday night when you all arrive will be "Politics and Poker." Each arriving delegate will report to his state chairman and be given the agenda for the weekend, duties to perform if he wishes any, and a kit containing balloons, noisemakers, streamers, hats, badges, etc. Each area and state will want adequate publicity, so sign-making materials will be supplied in generous quantities. By Saturday night, one of the area delegations, by means of vote buying, cajolery, and skullduggery will have emerged victorious in the balloting and will be given a prize suitable to the occasion. Your committee plans to have thoroughly professional coverage of this event. All speeches will be tape-recorded for playback at the 20th Reunion and a press corps of four classmates accomplished with the camera will roam through the throngs. . . . The balance of the meeting was spent in acquiring gluey tongues while we licked flaps and stuck stamps on the first mailing to all of you. **Joe Lynch** and **Ed Kerwin** get low bows for their work in preparing the material. It included convention stickers for your car windows, a descriptive flier, and application forms. If you didn't get yours, let one of the undersigned know and the grievous error will be rectified.—**Frank T. Hulswit,** Secretary, A. D. Little, Ltd., 197, Knightsbridge, London S.W. 7, England; **Fletcher Eaton,** Assistant Secretary, 83 Herrick Road, Newton Centre, Mass.

'50

I have done so much writing lately, I haven't had any time for reading. So I got together with Arnold Putnam and Robert Barlow of Rathe & Strong in Boston and wrote a book which I now enjoy reading over and over again. It's called "Unified Operations Management," and we hope it will have value to those who agree with our concepts. . . . **Richard A. Gnecco** has been promoted to technical service supervisor of Lustrex-Lustran at Monsanto Chemical Company's Springfield plant. Upon graduation, Dick worked for Boston Woven Hose and Rubber Company as a product development engineer and technical supervisor of plastics. Dick is a member of the American Chemical Society. . . . **Thor Stromsted** has been named product manager of special machinery by the Kwik-Mix Company, a division of Koehring Company in Milwaukee. Thor was previously with the T. L. Smith Company of Milwaukee as a project engineer and

with the Oliver Corporation in sales of aircraft and construction equipment.

James Geiser, Assistant to the Vice-president of engineering, was promoted to director of engineering of the West Penn Power Company. Jim went with West Penn after his graduation; he will administer the centralized engineering activities of the company and will provide staff assistance and services to general office and field organizations on engineering matters. His engineering function covers civil, communications, electrical, planning, research and development. . . . **Harrison C. White** joined the Harvard faculty last summer as associate professor of sociology. Harrison studied physics at Tech but shifted to the study of social problems during a year at the Center for Advanced Study in the Behavioral Sciences. He completed his sociological training at Princeton and holds both his Ph.D. in theoretical physics from Tech and the Ph.D. in sociology (1960) from Princeton. His published works include three papers on molecular theory, and "An Anatomy of Kinship." He previously was an assistant professor at the University of Chicago and taught earlier at Carnegie Institute of Technology. . . . I hope to be more prolific in my next notes.—**Gabriel N. Stilian,** Secretary, 4 Biscayne Drive, Huntington, L.I., N.Y.

'52

It's about time this column got written, and I could use more material than seems to be coming in, so write, darn you, write, and let us hear where you are and what you are doing. . . . **S. Parker Gay, Jr.** is now an independent geophysical contractor in Lima, Peru, specializing in exploration surveys in South America. . . . Dr. **Alwyn C. Scott** is now an assistant professor at the University of Wisconsin, Madison. . . . **Sandy Kaplan**'s Sanford Construction Company Inc., has a recent development of 61 three-, four- and five-bedroom houses out in Franklin, Mass. . . . Dr. **Kevork V. Nahabedian** is now an assistant professor of chemistry at Union College, N.Y. . . . And **Arthur S. Chivers** of Wellesley has been made vice-president of new business development by Barry Wright Corporation in Worcester. . . . Class President **Gus Rath** has gone back to Chicago and is teaching at Northwestern University. . . . **Fred Ward** of Weston is now chief Channel 7 weatherman in addition to being employed in geophysical research for the Air Force at Hanscom Field. . . . **Merton Hoppenfeld** has been named senior planner for Community Research and Development, Inc., in Baltimore, Md. Until recently he had been chief of urban design with the National Capital Planning Commission in Washington. . . . **Jim Margolis** had an article entitled 'Basic Thermoforming Technology' published in the S.P.E. Journal, July, 1963. Jim has his own firm of Chemical Marketing & Research Company, New York, which puts out a very fine plastics newsletter, concerned with plastics research and marketing.

Colonel **Amos Chorev,** Chief of the Ordnance Corporation, Army of Israel, has been back in the States speaking on behalf of the United Jewish Appeal. . . . **Robert E. Dargie** is now project engineering manager at American Optical Company with responsibilities including design and development of processing equipment used in company branch laboratories. . . . **Tom Stern** is at present an associate professor of electrical engineering at Columbia University, where his areas of research include analog computation, nonlinear network theory, information theory and nuclear measurements. . . . **Paul A. Flinn** is an associate professor of physics and metallurgical engineering at Carnegie Tech in Pittsburgh. . . . Lieutenant Colonel **Mark Jones,** U.S.M.C., had an excellent article in the 'U.S. Naval Institute Proceedings' of August, 1963 discussing the scientific resources of the country and some ideas on their most beneficial application in government-industrial efforts. He is presently assigned as project officer, Advanced Air-to-Surface Missile Systems, Missile Division, Bureau of Naval Weapons. . . . **Cliff Sayre** is now a research supervisor, Industrial and Biochemicals Department at the DuPont Experimental Station in Wilmington, Del. And that is about all the news for now. As you can see, the mail box is empty. Won't you please drop a line so we can keep a column running?—**Dana M. Ferguson,** Secretary, Box 233, Acton, Mass.

'55

At the annual meeting of the Water Pollution Control Association in Seattle in October **James Symons,** who is associated with the Robert A. Taft Sanitary Engineering Center of the Public Health Service in Cincinnati, was a recipient of the Harrison Prescott Eddy Award "for outstanding research in the fundamental processes of waste water treatment." . . . Consuelo and **Gene Peterson** and their two children left Minneapolis last summer for Bucharest, Romania, where Gene is studying at the Institute of Architecture under a Fulbright grant. Since leaving M.I.T., Gene had been working at several firms in Minneapolis and doing graduate work in urban planning at the University of Minnesota. . . . **Olaf** and **Cora (Sleighter) Stackelberg** and their three boys also left that area last summer, Olaf having received his doctorate from the university. They are now in Durham, N. C., where Olaf is teaching mathematics at Duke University. . . . In September Gretchen and **Charlie Prewitt** vacationed in Switzerland and Italy en route to Rome, where Charlie delivered a paper at the meeting of the International Union of Crystallographers. . . . **Charles Merriam** was one of seven General Electric engineers to participate in the Second Congress of the International Federation of Automatic Control last August in Basle, Switzerland; he collaborated with a research partner in the presentation of a paper on a longitudinal guidance system for aircraft landing. . . . **Joyce Davis,** now a full-time New Yorker, having moved into a house in the Village, is co-author with an associate at Burns and Roe of an article appearing in the June issue of 'Consulting Engineer,' "The Future of Energy Conservation."

The July 'I.E.E.E. Transactions' contained an article by **Allan Schell** on spherical reflector antennas, one of his chief interests at the Air Force Cambridge Research Laboratories, where he has been employed in both civilian and military capacities since 1956 with intermittent study—a year at the Technical University at Delft, Holland, under a Fulbright grant and a further year at M.I.T. under a joint N.S.F.-U.S.A.F. fellowship to complete his doctorate . . . In the same publication was an article by **Michael Horstein,** who, since receiving his doctorate in 1960, has been working at Hughes Aircraft in Culver City, Calif, primarily on space communications. Mike spent the summer of 1956 at Societé d'Electronique et d'Automatisme in Courbevoie, France, under an M.I.T. Overseas Fellowship and was awarded N.S.F. and G.E. fellowships during subsequent study; he worked at Lincoln Laboratory during his last two years in the Boston area. . . . **Bertram Newman** has been named director of marketing for Telecomputing Corporation, North Hollywood, Calif., in their electronic systems and data instruments divisions. He taught courses at U.C.L.A. in industrial marketing and lectured in engineering while holding previous positions in the electronics industry. . . . From Lexington, Mass., **Richard Lyon** journeyed to Lexington, Ky., last spring to lecture at the University of Kentucky on acoustics and the interaction of noise with structures, his speciality at Bolt, Beranek, and Newman in Cambridge. Since leaving M.I.T. he has studied at the University of Manchester in England under a N.S.F. post-doctoral fellowship and done some teaching. . . . **Lawrence Kaufman** is now research director of ManLabs, Inc., Cambridge, where he recently completed several significant projects in metallurgical research. With Valerie and their three children he lives in Malden. "That's all, folks."—Co-secretaries: **Mrs. J. H. Venarde (Dell Lanier),** 2401 Brae Road, Ardentown, Wilmington, Delaware; **L. Dennis Shapiro,** Aerospace Research, Inc., 130 Lincoln Street, Brighton 35, Mass.

'56

Walter Bachman has written to fill us in on his activities since June, 1956. After leaving Tech he worked for Cornell Aeronautical Laboratories in Buffalo, N.Y., but soon moved to United-Carr Fastener where he has been for over five years. Walter is now manager of engineering for Dot Machinery Company, a division. Walter wed Jean Gibbon of Rochester, N.Y., in February, 1959, and they have three children—Scotty, Paul, and Cara. . . . **Curt Burrowes** writes that he and Katherine have a son, Thomas Dirk. Curt left his research work at Tech in 1960

to help found Mosaic Fabricators, a firm in Southbridge, Mass., which specializes in fiber optics. . . . **Curt Flory** has joined the Mobil Chemical Company, a division of Socony Mobil Oil as an analyst in the planning department. Curt and Barbara (née Brooks) of Lowell, Mass., have two sons and one daughter. . . . Word has recently been received of the death of **Panos M. Kyrtsis** on September 12, 1963. We know no details.

John R. McCarthy, Assistant Professor of Mathematics at Holy Cross, has received a National Science Foundation Faculty Fellowship to study at Catholic University in Washington during the current year. . . . For those of you who do not read the newspapers, another first for the most wanted class: **Russ Schweickart** has been selected to become an astronaut and is now in Houston where he will begin training next month. Russ has been working at the Instrumentation Lab where the Apollo guidance system was designed. Russ, Claire and their four children were besieged by the press after the announcement, but **Doretta Binner Klein** managed to book them for a sendoff get together of classmates and church friends in November. Russ was also a guest at the November luncheon of the Boston M.I.T. Club. . . . A recent rumor has Dr. **Dave Quigley** doing aeromedical research at Brooks A.F.B., Texas. . . . **Walter Thorbjornsen,** who works for the Public Works Department in Western Australia, was the Tech representative at the 50th Anniversary celebration of the Union of Western Australia in November.—**Bruce B. Bredehoft,** Secretary, 16 Millbrook Road, Westwood, Mass.

'57

Here are some more letters. From **Bob Holton** I received the following news: "I will briefly try to recap the past six years since I left the Boston area. I started work as an engineer for Cowles Chemical Company in Skaneateles Falls, N.Y., which is just west of Syracuse. I held that position for a year and was then transferred into the production department as process supervisor, a position I held until February, 1961, except for nine weeks with the USAF in 1958. Then I was transferred to Joliet, Ill., as plant superintendent of Cowles's new plant. The major products are industrial alkalies used in the detergent industry. I was married in August, 1959, to the former Sonja Herrmann and endured one-and-a-half years of nurse's training at Syracuse University. Since we have been in Joliet, she has worked in a local hospital and as a county public health nurse. Presently her interests are our seven-month-old son and the local chapter of the American Association of University Woman, of which she is president. In addition to keeping the plant in operation, I'm busy as a director of the Manufacturer's Association, a member of a city committee studying air pollution, and a member of the Joliet Chamber of Commerce. The only news I have about classmates is that **George Bohlig** was married to Joan Seiberlich in Appleton, Wis. They are now living in the Minneapolis area; George is employed by 3M." . . . **Gary Dischel** sent the following note: "I'd like to report that I have been transferred within the Hotel Corporation of America from the central office to the position of assistant general manager of the Royal Orleans Hotel in New Orleans, La. This hotel is without question one of the finest in the South, and I sure would welcome the opportunity to host any of our classmates passing through the country."

Bob Berg wrote from New York: "After two years in the Army at the Chemical Research and Development Labs, Edgewood Arsenal, Md., I'm working now as assistant to the manager of marketing and planning of Nargatuch Chemical International, a division of the U.S. Rubber Company. At home I'm active in church affairs." . . . **Dennis Begany,** I learned, is now employed by the Scientific Design Company of New York. At present he is working on a new plant being built in Gela, Sicily. With him in Sicily is the former Barbara Olson whom he married in June before leaving. Dennis is an avid bridge player and a student of judo. . . . **Bill Clayton's** letter read as follows: "Although I hardly qualify to continue on The Review mailing list (by virtue of my brief, disastrous fling at M.I.T.), I appreciate being kept on the team. United Press International transferred me to Houston in July to be bureau manager here after four years as a newsman for UPI in Austin, Texas. Houston is a fast and furious news town. The NASA news alone is a big challenge. So all in all it is a gratifying assignment, and I hope to be here many years. Incidentally, covering space news brings frequent mention of M.I.T. and the part it is playing. Despite the fact that I went into journalism after an unsuccessful try at electronic engineering at M.I.T., I still consider it at least my partial alma mater (one fourth M.I.T., three fourths Texas University)." . . . A form letter sent by **Stu** and Denny **Keeler** to all their friends found its way to my mailbox. Amidst many details on members of the family and Gypsy (60 lbs., typical teenage adolescent, smart, devilish, and a good watchdog), I uncovered the following news: Stu terminated his activities with Uncle Sam in May and is now with the Great Lakes Steel Company as a senior development engineer. He has been doing work on metal deformation and stamping and visits many automotive companies in Detroit. The thesis he has been working on was published by the ASM, and in October he presented it orally in Cleveland. Denny is still teaching math and science and working on her master's degree. . . . Well that's all for now. Keep me posted. —**Frederick L. Morefield,** Secretary, 1-A Acorn Street, Boston 8, Mass.

'59

Only five months to go. I hope everyone is making plans to attend our 5th Reunion. Remember June 13 and 14 at the Chatham Bars Inn at old Cape Cod. It really looks like it's going to be one of the finest reunions ever! Just look at the reunion committee: Dave Packer is chairman, Dick Sampson, Larry Bishoff, Jerry Stephenson, Glenn Zeiders, Ralph Alter, Al Bufferd and, of course, Al Oppenheim. . . . In line with class reunions, etc., there is the slight problem of class dues. Honest guys, it takes a little cash to keep our class in the black. Please send $3.75 (if you haven't already) to "M.I.T. Class of 1959," c/o **Chuck Staples,** 1589 Arcadia Street, Orlando, Fla. That's only 75¢ a year since graduation. . . . I received a letter from **Larry Bishoff** recently. Larry writes: "**Jack Fischer** is in Pittsburgh now; he did a stint in the service, and like me got caught in the Berlin situation. He got out a year later. He now has two children, a boy and a girl, and is working at Jones and Laughlin Steel Corporation as an industrial engineer. **Irv Weinman** has been studying literature at Trinity College in Dublin. He bummed around Europe with his wife one summer in a panel truck refitted as a trailer, and spent some time rowing for Trinity. He's now at Cambridge University in England, presumably continuing his studies. As for me, I am residing in Brookline—have been assistant to the Dean of Student Affairs since June 1962, and my wife Trish and I are almost with child." Larry was good enough to enclose a letter he received from **Adul Pinsuvana.** Adul is now back in the States studying at Arizona State University. Adul has spent the past four years in the Thai Air Force. He is married and has a baby girl. Adul is planning to make the trip East for our big reunion in June.

Fred Sellers is with I.B.M. in Poughkeepsie, N.Y., and has been working on the application of coding and redundant logic to machines for improving reliability. Fred recently had an article published in I.E.E.E. Transactions on "Electronic Computers." . . . Most of you probably know that '59ers seem to be taking a very active role in M.I.T. affairs. In addition to Larry, mentioned above, **Dick Sampson** is administrative officer of the Department of Civil Engineering, and **Owen Haselton** is working for the Registrar's Office. . . . **George Huguenin** has been appointed assistant professor of astronomy at Harvard. George has been working with the Space Radio Project at the Harvard College Observatory. . . . **John Brackett** received his Ph.D. in chemical physics from Purdue, and is working for Research Associates Corporation in Maryland.

Last September, a Boston newspaper carried the following headline, "Cruelest Theft of Year Committed in Cambridge." The article told of the theft of **Kost Pankiwskyj's** doctoral thesis from his car. All of Kost's copies were taken. Kost and his wife Paula spent the better part of the past four years on this work. We sincerely hope everything is straightened out by now! . . . Effective February 1 your secretary will no longer be supporting the internal workings of our government. I am returning to Columbia to complete my Ph.D. in international busi-

ness. Please watch for my new address and keep writing.—**Robert A. Muh,** Secretary, M-424 Arlington Towers, Arlington 9, Va.

'61

A postcard reporting on the whereabouts of **Stephen Carr** located him in Europe for the first part of last year, where he was studying Rome and Greece. Now back at M.I.T. in Course IV, he is married and working in the Joint Center for Urban Studies. . . . **Al Brennecke** has also returned from Europe (Norway, I believe), and spent last summer here in Cambridge, with IBM. He is now in his second year at the Harvard B. School, as is **Dick Purcell.** Dick is in charge of the New England operation of the "Small Business Placement Program" this year. Last summer was spent with Westinghouse in Washington, D.C., in the Space Electronics Division, where he was involved in market planning as well as liaison with M.I.T. and NASA's Northeast Office. Dick writes in red ink; I trust, though, that he left Westinghouse in the black. . . . **Ken Singer** was completing his second year at Columbia Medical School when he wrote, saying he "enjoyed it very much." . . . **David Latham** writes: "I am presently serving time at that red brick place up the river in the Astronomy Department. I have concluded that the average Harvard freshman is just as grubby as the average Tech freshman—instead of T-shirts and chinos they wear tweed coats and dungarees. . . . Baby makes three." . . . **Charlie Ruttenberg** has been in the Political Science Department of N.Y.U. as a teaching and research assistant. Says he: "Nobody will believe it, of course, but Course XXI really came through for me as preparation. In the summer of 1962 I toiled under a Nigerian sun with Operation Crossroads Africa." . . . **Gary Fultz** writes from Pasadena, where he works at Jet Propulsion Laboratory as a research engineer, responsible for development of advanced telemetry and video transmission systems. U.C.L.A. Grad School at night for Gary. . . . **Romney Biddulph** is working for Ford in Ann Arbor, Mich., as a financial analyst. At the time he wrote, he said he often saw **Ira Jaffe,** who then lived in Ann Arbor. Ira, however, has since moved and is at 13601 Kenwood, Oak Park 37, Mich. . . . **R. H. Towe** was finishing his second year of law school at Yale when he wrote, was engaged to marry Neely Paul in Jacksonville, Fla., on June 22, 1963. . . . **Walter Krolikowski** is studying electrical engineering at Stanford, hoped to be a Ph.D. candidate by now.

Turning to our classmates under arms, in November I noted that **Al Klancnik** was with the Army in Fort Sheridan, Ill. The Public Information Office there reports further that he was recently promoted to the rank of first lieutenant. Al is a special services officer, and is in charge of planning recreational activities on the post. He and his wife Pat live in Fort Sheridan; their first child was born last June. Boy or girl, Al? . . . **Pete Fishman** turned up in another Army press release; he took part in exercise Sky Soldier I, a 23-day 11th Air Assault Division maneuver in Georgia last October. Pete is a medical operations assistant. . . . **Bill Scanlon** brought us up to date on his activities since graduation: "I worked in Boston from June, 1961, to February, 1962, for the Massachusetts Port Authority; then entered Navy Officer Candidate School in Newport, R.I., and was commissioned an ensign in the Civil Engineer Corps on 15 June 1962. Following this came two months of schooling in California. My present post is that of utilities officer in Argentia, Newfoundland. Very little money—great deal of responsibility. Obligated service until 15 June 1965. Leave here in March, 1964." Bill's address: OICC Box 50, Navy #103, c/o FPO, New York, N.Y. . . . **Pete Crichton** is stationed "out here in Winthrop at Fort Banks"; he sounds lonely; he included his telephone number (VI-6-9100, Ext. 279). Says he's leaving the Army in February, 1964. Where to then, Pete? . . . On top of the world is **Paul Fricke,** who writes: "I've been here in Northern Italy, near Venice, with the 62nd Engineer Company (APO 221, New York, N.Y.) since May, 1962. On September 29, 1962, I was married to Martha Harris of Athol, Mass., who flew over for the wedding. Since then we've been passing our time swimming and skiing, as Army duty permits." . . . **Bill Leffler** dropped a line to say that he was married in June, got his M.B.A. from N.Y.U. in the same month, left the Navy in July, and went to work for Shell Oil in New York City, but that other than that, "not much is happening." Drop me a line when things begin to move down your way, Bill.—**Joseph Harrington, 3d,** Secretary, 1610 Westgate, Cambridge, Mass.

'62

Richard Helmig, VI, was married to Nancy J. Quinn of Wyncote, Pa., last June. Nancy graduated from Simmons College. Richard is working towards his master's degree at the Wharton School of Finance and Commerce at the University of Pennsylvania. . . . **Henry McCarl,** XII, is working for his doctorate at Penn State. He was married to Louise B. Rys of Pittsburgh, last June in Pittsburgh. . . . Also at Penn State is **Richard Queeny,** II. . . . **George Krebs,** VIII, who is a graduate student at Rutgers University, worked at Los Alamos Scientific Laboratory in New Mexico last summer. . . . **Marcus H. Ray,** I, is now a structural engineer for the city of Chicago. He has completed postgraduate work at the Imperial College of Science and Technology of the University of London. Before entering Imperial College, Marcus participated in an exchange program which placed him with a British contractor, John Laing & Sons, Ltd., for an eight-week period of site engineering practice. . . . **James Beetem,** II, is a second lieutenant at Perrin A.F.B. in Texas. . . . **Douglas Gaidry,** XV, completed an eight-week officer orientation course at the Southeastern Signal School in Fort Gordon, Ga., last August. . . . **David C. Corson,** X, received a master of science in chemical engineering from Lehigh University in October. . . . **Carl A. Bauer Jr.,** XI, reported on the use of polymers for intermediate treatment in municipal sewage treatment plants at the 36th annual meeting of the Water Pollution Control Federation. . . . **Robert Lytle,** II, who worked as a development engineer for Eastman Kodak in Rochester, N.Y., completed a nine-week officer orientation course at the Ordnance Center, Aberdeen Proving Ground, Md., last July.

Bardwell Salmon, I, President of the class, represented our class at Alumni Day last June 10. . . . **Charles Moser,** VI, who is working for the Massachusetts Electric Company at their Lynn office, was married last July to Nydia Borozny. They are living in Rockport, Mass. Mrs. Moser graduated from Lesley College in Cambridge last June. . . . Dr. **Karl A. Hartman, Jr.,** V, has joined the staff of DuPont's Central Research Department. . . . **Richard Shaffner,** VI, was married last June to Dorothy E. Haserodt of Rockport, Mass. Dorothy received her degree from the Boston University School of Nursing. Richard is currently working towards his doctorate at the Case Institute of Technology in Cleveland, Ohio. . . . **George Hecker,** I, who married Mary Jacobelli, is now living in Knoxville, Tenn., where he is working for the T.V.A. in hydraulic research. . . . **Lewis Glanville,** VI, is working in the communications department of the Mitre Corporation in Boston. . . . Army Second Lieutenant **Gordon H. Jones,** XV, completed an eight-week officer orientation course at the Southeastern Signal School in Fort Gordon, Ga., last April. . . . Dr. **Andrew Kahr,** XVIII, was appointed an assistant professor of business administration at Harvard University. His field is managerial economics. . . . Army Second Lieutenant **James W. Kesler,** I, took part in a NATO exercise in Germany last May. He is with the 69th Engineer Company.

Paul Olmstead, VI, is working for the Stanford Research Institute in Palo Alto, Calif. He received his master's degree in electrical engineering and surfing last summer at Stanford University. . . . **Art Samberg,** XVI, who was married to Becky Posner of Detroit, last August, is living in Palo Alto and working for Lockheed Aircraft Company in Sunnyvale. Art received his master's degree in aeronautical engineering from Stanford University last summer, and Becky received a master's degree in history. . . . **John Ohlson,** VI, who is working for the Stanford Research Institute, is living in Mountain View, where he is the manager of the apartment building in which I live. John's wife, Vernie, gave birth to a girl, Jean, last June. Also living this apartment building and all attending Stanford Business School are **Gordon Mann,** XV, **Barry Roach,** XV, and **Richard Garber,** I.—**Gerald Katell,** Secretary, Stanford Business School, Palo Alto, Calif.

M.I.T. Varsity Athletic Events Coming Up

Basketball

Jan. 10	Bowdoin	8:15	Away
11	Bates	8:15	Away
15	Lowell	8:15	Home
17	Kings Point	8:15	Home
18	Adelphi	8:15	Home
21	W.P.I.	8:15	Home
Feb. 5	Stevens	8:30	Away
6	Newark		Away
8	Brooklyn Poly		Away
12	Bowdoin	8:15	Home
18	New Hampshire	8:15	Away
22	Middlebury	8:00	Away
26	Tufts	8:15	Home
28	Coast Guard	8:15	Away

Fencing

Feb. 4	Fordham	6:00	Away
5	St. John's	3:30	Away
6	Brooklyn Poly	5:30	Away
7	Seton Hall	4:00	Away
12	Harvard	7:00	Home
15	Brandeis	2:00	Home
21	Newark	7:00	Away
22	Stevens	2:00	Away
29	C.C.N.Y.	2:00	Home

Hockey

Jan. 10	Pennsylvania	7:30	Home
11	W.P.I.	7:00	Home
15	Amherst	3:00	Away
17	Bowdoin	7:15	Home
18	Connecticut	5:00	Home
Feb. 6	Merrimack		Home
7	Hamilton	7:00	Home
8	Connecticut		Home
14	W.P.I.		Away
15	Wesleyan	5:00	Home
19	Massachusetts		Away
21	Rutgers	7:00	Home
26	Amherst	5:00	Home

Squash

Feb. 14	Princeton	7:00	Home
21	Pennsylvania	4:00	Away
22	Trinity	2:00	Home
29	Wesleyan	2:00	Home

Swimming

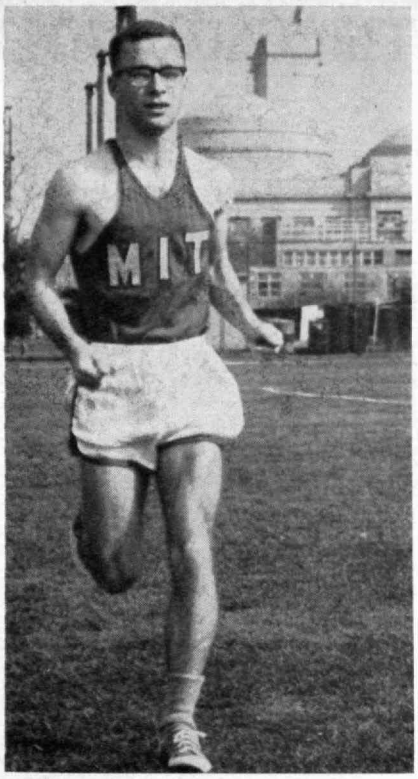
Feb. 4	Brooklyn Poly	7:00	Away
8	Amherst	2:00	Home
15	Trinity	2:00	Home
19	Wesleyan	8:00	Away
26	Brown	8:15	Home
29	Springfield	2:00	Home

Indoor Track

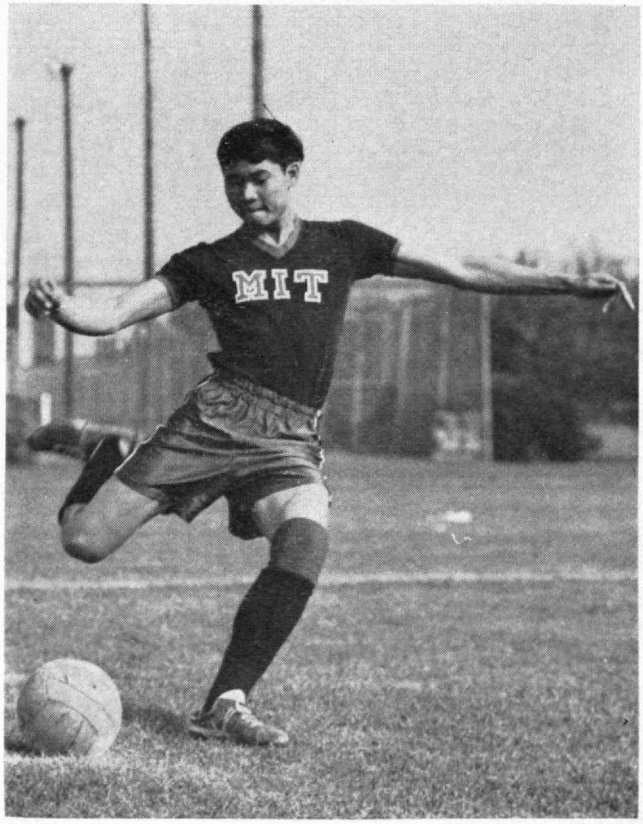
Feb. 8	M.I.T. Invitational	2:00	Home
12	New England A.A.U. Championships		
14, 15	Greater Boston Championships—at Northeastern		
18	Brandeis	7:00	Home
22	New Hampshire	12:30	Home
29	Bowdoin	12:30	Home

Wrestling

Feb. 6	Brooklyn Poly	5:30	Away
8	Massachusetts	2:00	Home
15	Springfield	2:00	Away
22	Dartmouth	3:30	Home
29	W.P.I.	3:30	Home



W. SUMNER BROWN, '66, of Pittsburgh, scored six straight first places last fall to set the all-time M.I.T. cross country course record at Franklin Park. M.I.T. won eight and lost five.

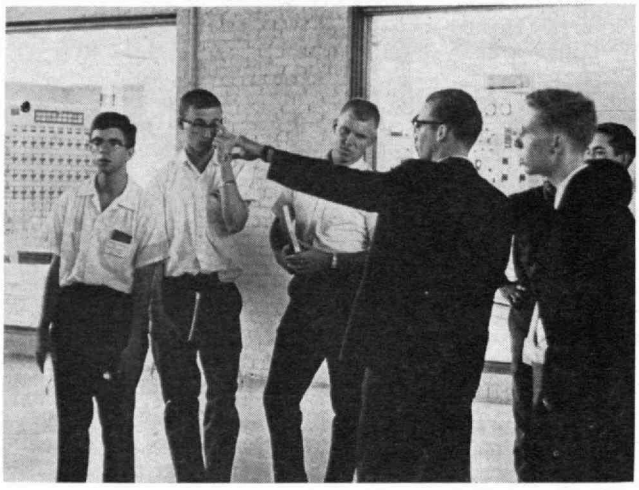


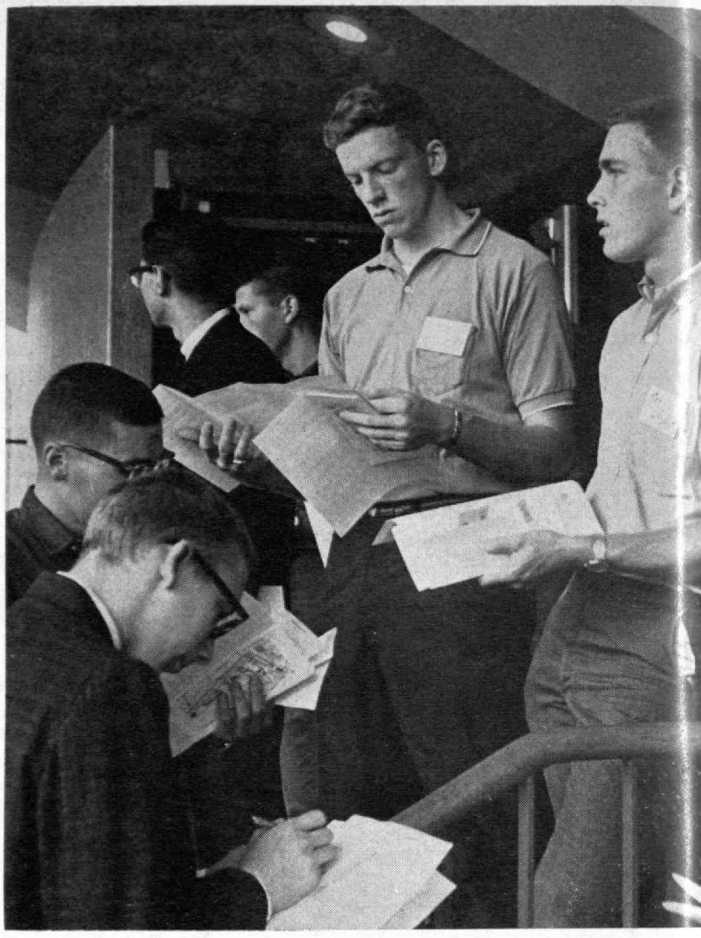
SAVITRA BHOTIWIHOK, '66, of Thailand (above), fullback, and Robert Mehrabian, '64, of Iran, were soccer pacesetters. Mehrabian, center forward, lead the M.I.T. team—scoring 13 to bring his career total to a record 40.

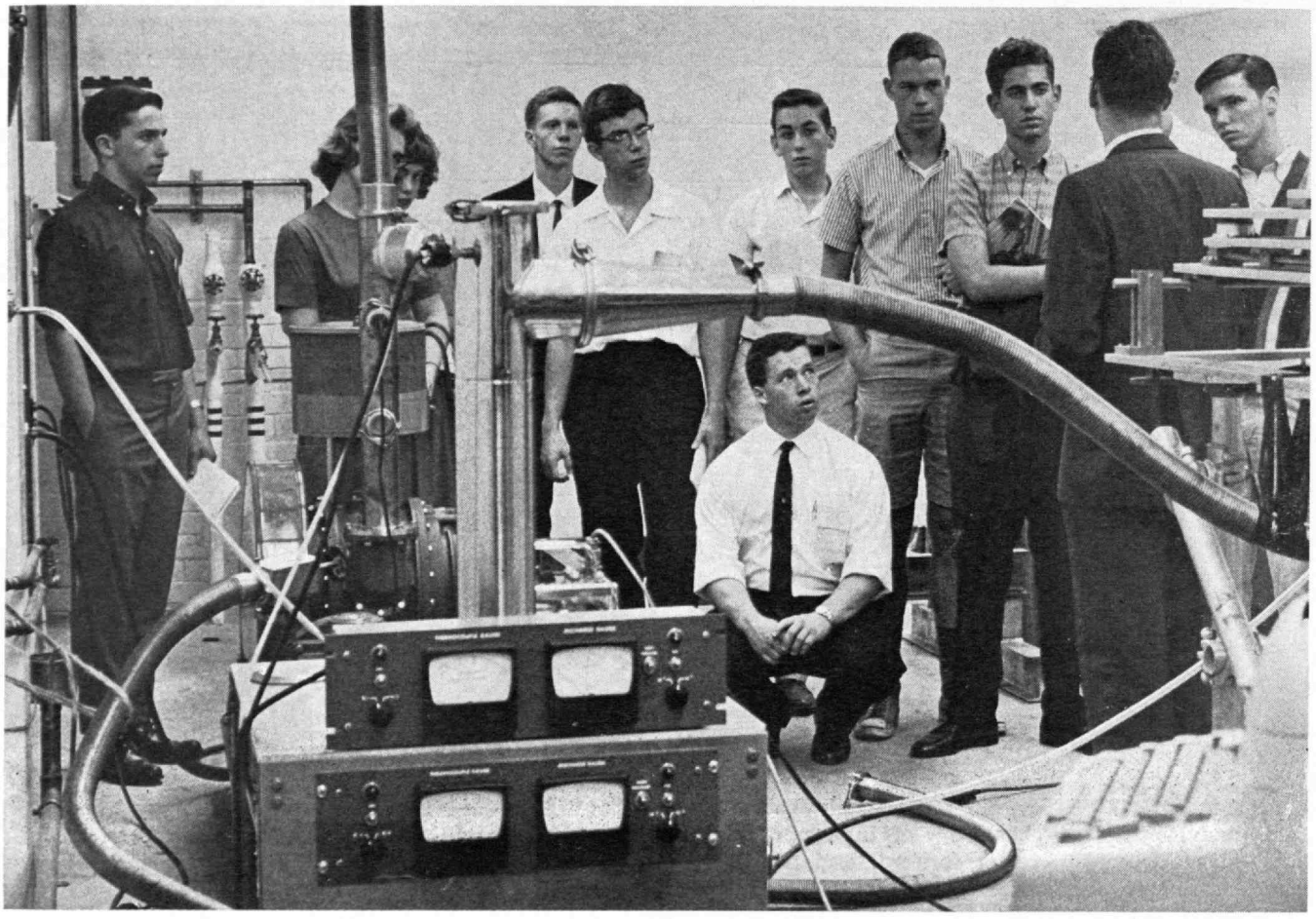
DAVID J. DUNFORD, '64, of Washington, Conn., as goalie, provided the soccer team with top defensive efforts last fall, handing Harvard and Bridgeport their first defeats of the season. M.I.T. won five, lost four, and tied two.

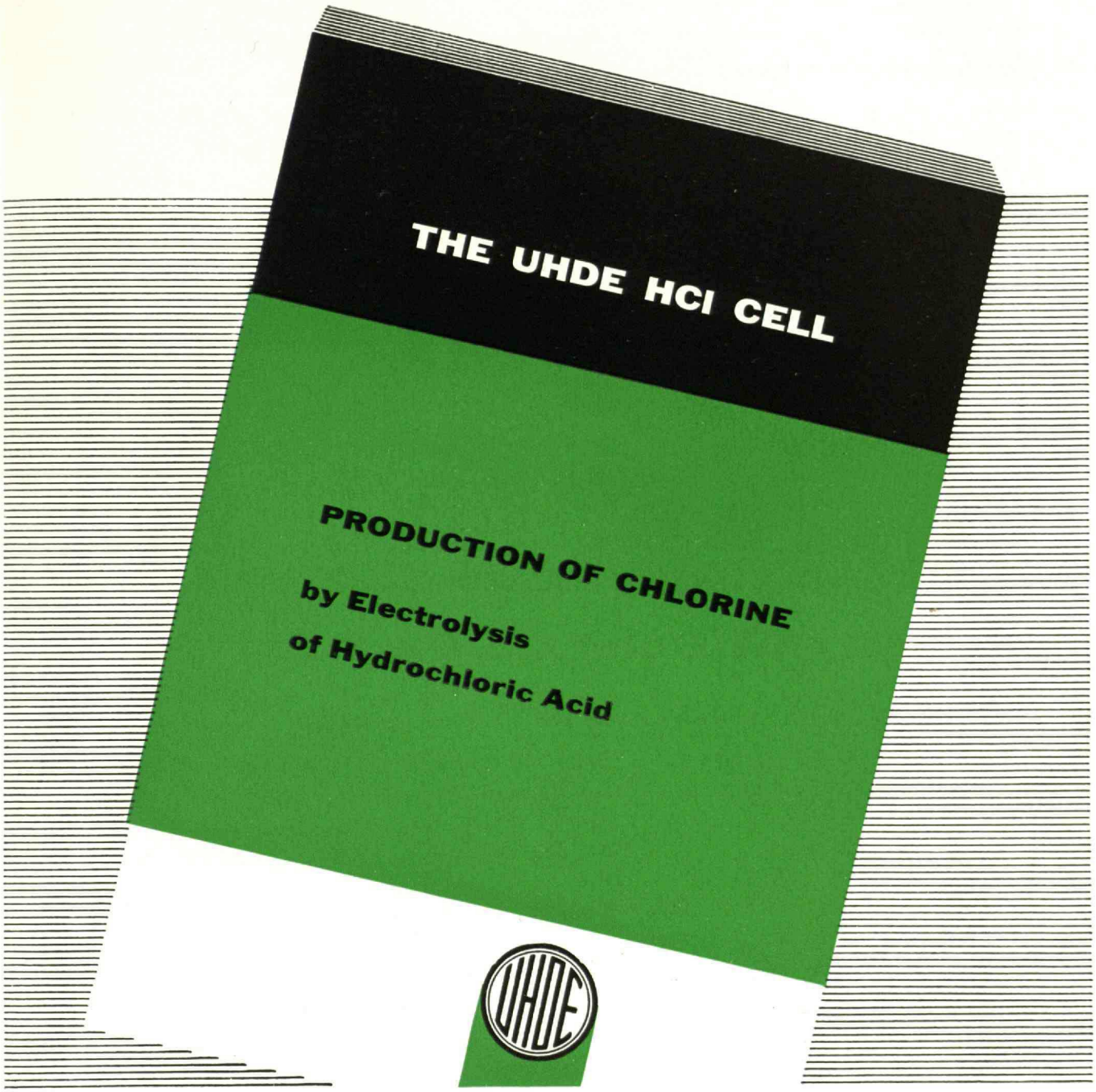
The Class of '67

THERE'S MORE for a freshman to see, and it's more of a job to find your way from one place to another, at M.I.T. now than at the school most Alumni remember. These pictures were taken of the Class of '67 in the Kresge lobby (at right) and on a tour of the new National Magnet Laboratory over on Albany Street.









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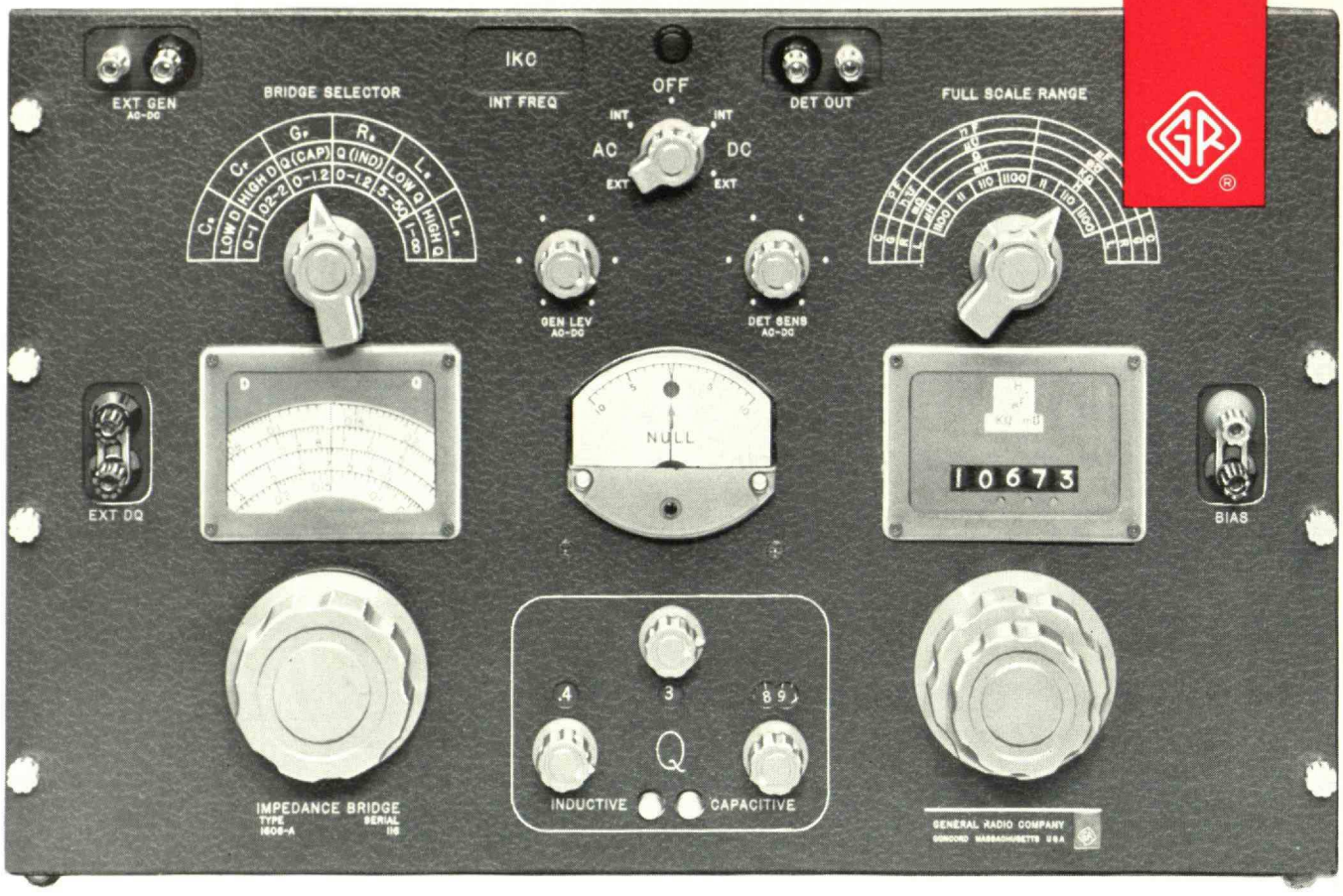

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